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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Cumulative, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 1 FEBRUARY 1950 No. 2

SPECIAL FEATURES IN THIS ISSUE

Review of 15 Meteorological Periodicals which have Lapsed

A Cumulative, Annotated Bibliography on Aerobiology

(*For complete table of contents see back cover*)

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"The true University of these days is a Collection of Books."

Thomas Carlyle

FOREWORD

A student entering a university for the first time could be forgiven for not comprehending the vastness of the field of knowledge which he would wish to explore during the next four or more years. In a like manner the editor of this publication had little conception of the wealth of unexplored and uncorrelated publications of current interest to meteorologists, until he started to wander afield from the narrow confines of literature classified as *meteorological* in the Library of Congress and other great collections of books. Naturally about 50% of the material in the classes labelled *geophysics* and *astronomy* were of meteorological significance, but it was not until the stacks containing material on *physics*, *chemistry*, *geology*, *geography*, *natural science* and finally *philosophy* had been explored did it become evident that important meteorological literature could be buried in any of the numerous volumes of the 40,000 or more different scientific periodicals which have been issued since 1665.[1]

It thus became evident that some effort should be made to integrate the knowledge gained through exploration of these obscure sources, by means of systematic reviews in the early issues of this publication, to be used for reference purposes. Such a task is time consuming, but should serve as a contribution to our knowledge of meteorological sources, for this material is contained in no other published form.

The reviews which are the result of this searching, are presented in the following order:

(1) A Review of 30 Current Meteorological and Geophysical Periodicals. (Vol. 1, No. 1, Jan. 1950)
(2) A Review of 15 Meteorological Periodicals which have Lapsed. (Vol. 1, No. 2, Feb. 1950)

It soon became apparent that there was another unexplored field where work should definitely be done, even though the task seems hopeless, and that is the preparation of **cumulative bibliographies** on the numerous subjects which comprise the field of meteorology, especially those fields which overlap other sciences, making it difficult to find much material collated in any library catalogue under the given subject or class. Anyone who has ever attempted to prepare a bibliography on microclimatology, industrial climatology, aerobiology, planetary atmospheres, energy exchange over the ocean, turbulence or austausch, will appreciate the problem which is involved, the time which must be consumed, and hence the importance of someone doing such work systematically and publishing it in some conveniently located source, such as this periodical. It should be appreciated, also, that with hundreds of possible subjects, and hundreds of references on each subject, it will take years to cover the field of meteorology even roughly, and even then none of the bibliographies can be exhaustive. At this time, then, the **special bibliographies** will be as comprehensive as it is possible for one person to make them and still meet the monthly deadlines.

The subjects chosen for the first four issues have been: (1) Atmospheric Pollution, (2) Aerobiology, (3) Cloud Physics (Artificial Precipitation), (4) Hail. Other important subjects have been suggested, and will be kept in mind for future issues.

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[1] By 1897 there were over 8,000 such serials or journals, and by 1936, according to the Oxford World List of Scientific Periodicals, there were 40,000 or more. The Union List of Serials in 1943 listed 75,000 serials, not counting trade magazines or experiment station publications. In 1949 the Science Museum Library in London was receiving 6,000 current scientific publications.

LIST OF PERIODICALS

Note: In this list the preferred form of title for entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organization follows the title. If the title is not distinctive the issuing organization precedes and is part of the title.

PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

kademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz., [Moscow].
merican Geophysical Union, Transactions, National Research Council, Washington.
American Meteorological Society, Bulletin, [Boston].
Annalen der Meteorologie, Meteorologisches Amt für Nordwestdeutschland, Hamburg, [British Zone, Germany].
nnali di Geofisica, Istituto Nazionale di Geofisica, [Rome].
iel et Terre, Société Belge d'Astronomie, de Météorologie et de Physique du Globe. Uccle-Bruxelles.
eofisica Pura e Applicata, Istituto Geofisica Italiano, [Milan].
eophysical Magazine, [Central Meteorological Observatory, Toyko].
emel en Dampkring, Nederlandse Vereniging voor Weer- en Sterrenkunde, [The Hague].
Időjárás, Az Országos Meteorológiai és Földmágnességi Intézet, [Budapest].
ournal of Geophysical Research (formerly Terrestrial Magnetism and Atmospheric Electricity), [Washington].
Journal of Meteorology, American Meteorological Society, [Boston].
Journal Scientifique de la Météorologie, Société Météorologique de France, [Paris].
The Marine Observer, Air Ministry, Meteorological Office, London.
The Meteorological Magazine, Air Ministry, Meteorological Office, London.
Meteorological Society of Japan, Journal, Second Series, Kisho Shushi, [Tokyo].
Meteorologické Zprávy, Státní Meteorologický ústav v Praze, [Prague].
La Météorologie, Société Météorologique de France, [Paris].
Meteorologische Rundschau, Bad-Kissingen, [U. S. Zone, Germany].
Monthly Weather Review, U. S. Weather Bureau, Washington, D. C.
Nimbus, Sociedad Meteorológica de Bolivia, [La Paz].
olarforschung, Archiv für Polarforschung in Kiel, [Kiel, British Zone, Germany].
Revista Meteorológica, Junta Nacional de Meteorología, Montevideo.
Rivista di Meteorologia Aeronautica, Associazione Culturale Aeronautica, [Rome].
Royal Meteorological Society, Quarterly Journal, [London].
he **Royal Society of London, Proceedings, Series A, Mathematical and Physical Sciences,** [London].
Tellus, Svenska Geofysiska Föreningen, Stockholm.
sesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Moscow-Leningrad].
Weather, Royal Meteorological Society, [London].
Weatherwise, Amateur Weathermen of America, Philadelphia.
Wetter und Klima, Deutscher Meteorologischer Dienst im Französischen Besatzungsgebiet, Seelbach b. Lahr/Baden, [French Zone, Germany].
Wetter und Leben, Österreichische Gesellschaft für Meteorologie, [Vienna].
Zeitschrift für Meteorologie, Meteorologisches Observatorium, Potsdam, [U. S. S. R. Zone, Germany].

★ Indicates those periodicals which are primarily meteorological.

EXPLANATIONS

Location of material: While it is physically impossible to give for each entry the name of ever library where that item might be obtained, it is possible, by using standard library symbols, to giv the reader some idea of where he might obtain such material. So in most instances a symbol take from the Union List of Serials (Gregory), or the Union Catalogue of the Library of Congress will b given just before the text of each abstract. In some cases where no symbol has been assigned t a library, one will be invented by using the general principle of the Union Catalogue list. As a rul the library indicated will be in the District of Columbia, with an occasional reference to one in Ne York or Boston. It will be noted that D stands for District of Columbia, M for Massachusetts an N for New York. Thus **DWB** stands for the U. S. Weather Bureau Library in Washington, D. C and **MH–BH** for the Blue Hill branch of the Harvard Library in Boston, Mass. In the latter cas since the Blue Hill Observatory contains not only the Harvard Observatory Library but that of th American Meteorological Society, the same symbol (**MH–BH**) will stand for either or both libraries

Library Symbols: The following abbreviations have been used for Libraries in which the specifi material thus indicated in this issue is located:

DA:	U. S. Department of Agriculture Library, Washington, D. C.
DAMS:	Material in hands of American Meteorological Society Abstracts, P.O. Box 173 Washington 13, D. C.
DAWS:	Air Weather Service, Technical Information Files, Andrews Air Base, Washingto 25, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DM:	U. S. Bureau of Mines Library, Washington, D. C.
DPL:	U. S. Department of Defense, (Pentagon) Library, Washington, D. C.
DSG:	U. S. Army Medical Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
MH:	Harvard University Library, Cambribge, Mass.
MH–BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society Library, Milton, Mass.
NNM:	American Museum of Natural History Library, New York.

Geographical (place) names are in the form generally used internationally, rather than in the for used locally. For instance Vienna is used instead of Wien, Florence for Firenza, Moscow for Moskv and Germany for Deutschland, etc.

Titles of articles or monographs are in the language of the original article unless otherwise state Slavic (Cyrillic) titles are transliterated according to the Library of Congress transliteration schem into the Roman Alphabet.

Entries for **titles of periodicals** are given in the form used on the title page of the periodical providin the title is distinctive (Monthly Weather Review, Meteorologiské Zprávy, and Revista Meteo ológica). If the journal is the official organ of a society or institution and the title is not distinctiv as is the case with Transactions, Bulletins, Proceedings, Comptes Rendus, Trudy, Izvestiia, Sitzung berichte, Verhandelingen, Miscellanées, etc., the preferred name of the organization is given firs as part of the title (American Geophysical Union, Transactions; Royal Society of London, Pro ceedings).

Abbreviations and other symbols:

Titles of periodicals are not abbreviated as a rule. Other abbreviations will be used sparingl and only when the abbreviation is obvious.

The months of the year from March through July are not abbreviated. Other months a abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec., respectively.

The word or abbreviation for Volume, (Tom, Band, Jahrgang, Año, etc.) and for Numbe (Heft, Fascicule, Vypusk) and page or pages is omitted from most entries. Thus an entry will rea as follows:

Meteorologische Rundschau 2(5/6):146–151, May/June 1949.

This indicates that the article was in the Meteorologische Rundschau, Jahrgang 2 (Vol. 2 Heft 5/6 (No. 5 and 6), pages 146–151, Mai/Juni 1949.

The Symbol * before an entry indicates a good data source.

The Symbol† before an entry indicates a good bibliography source.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

REVIEW OF FIFTEEN OUTSTANDING METEOROLOGICAL PUBLICATIONS WHICH HAVE LAPSED

2–1 551.5(06)

***Societas Meteorologica Palatina, Ephemerides.** Band I–XII, 1781–1792. Mannheim. 783–1795. illus., tables, 40 plates. 25½ cm. Editor: J. J. Hemmer. All text and titles in atin. **MH, DWB**—Although the **Ephemerides** could not be classed as a meteorological ournal in the current sense of that term, the twelve volumes issued at Mannheim constitute he first known serial publication strictly devoted to meteorology and meteorological observaions. The *Societas Meteorologica Palatina* was established in 1780 in Mannheim under the uspices of Kurfürst Karl Theodore, who was Elector of the Palatinate from 1742 to 1799. Ie was one of the most enlightened and the last of the long succession of rulers who had their eat at Heidelberg from 1155 to about 1700 (when the capital of the Rheinpfalz was removed o Mannheim). The Society was fortunate to have as a secretary, J. J. Hemmer, who was ireless in soliciting cooperation from all over Europe and America, in procuring and checking neteorological instruments to be sent to cooperating institutions, in checking and compiling he records and in editing and publishing the observations and summaries together with inructions and brief essays on meteorological phenomena. After Hemmer's death in 1790 the ociety languished and in 1795 disbanded due to the extremely unsettled military and political onditions of that decade. Nevertheless the twelve large annual volumes of the **Ephemerides** rovided the only consistent source of synoptic or even climatological data for a broad interational network of stations until half a century later when Lamont and his colleagues revived he network (Munich, 1840) or later Maury organized the cooperative maritime reporting netork at Brussels (1855) in order to compile more accurate hydrographic charts of the oceans nd coastal regions. Even then the program of observations was not so ambitious nor the reults so accurately compiled as was the case with the network of the Meteorological Society of he Palatinate. The latter had 25 stations in thirteen countries, reaching from Greenland to ome and from the Urals in Siberia to Massachusetts. Thrice daily observations of pressure, emperature, humidity, wind direction and speed, precipitation, evaporation, sky cover and ydrometeors were made under fairly uniform conditions by members of learned societies or niversity professors, so that fifty years later Prof. Daniel was able to make daily synoptic harts of the large area embraced by the network, and accurate climatological charts could be rawn for the first time.

A complete set of the **Ephemerides** is available at the Harvard University Library, as Iarvard was one of the two cooperating institutions in English speaking countries. One olume (that of 1782) and microfilm of the other volumes is in the library of the Weather ureau in Washington, D. C., and one volume (1783) in the John Crerar Library, Chicago. *ubject Headings:* **Meteorological observations, Societies, Germany, Palatinate.**

2–2 551.5(06)

Wochenschrift für Astronomie, Meteorologie und Geographie. Leipzig, Halle. Band -12, and 1–33 (NS), 1847–1891. Title varies. Editors: Dr. G. A. Jahn, (Leipzig), Dr. dward Heis, (Halle), and Dr. Hermann J. Klein, (Cologne). figs., charts, tables. All rticles in German. **DWB, DLC**—Dr. Jahn, who was director of the Astronomical Society in eipzig, and a corresponding member of the American Philosophical Society in Philadelphia, ounded this weekly journal and wrote most of the articles during his lifetime. Since he was n astronomer, his interests as reflected in the periodical, were mainly confined to such phe-omena as eclipses, sunspots, auroras, meteors, solar radiation, terrestrial magnetism and the

like. However, there were regular summaries of the weather conditions in central Germany accounts of storms, haloes, floods and so on, and in later years many original articles on clima tology, hydrology, instruments and methods of observation appeared, often in serial form The fact that this periodical was issued without interruption for 45 years makes it an excellen source for descriptive and statistical data on local weather occurrences in respect to long ter changes in solar conditions such as sunspots, magnetic storms, etc. After the **Monthly Weathe Review** was founded in the U. S. A. (1872), a regular feature of the **Wochenschrift** was comparison of weather for the past month in America and Europe. In the 1890 volume w find a series of articles on "Rain Formation," "Vertical Temperature Gradients," and th "Physics of Thunderstorms" as well as many on more popular subjects. *Subject Headings* **Astronomy, Terrestrial magnetism, Meteorology, Periodicals, Germany.**

2–3 551.5(0G

The **Scottish Meteorological Society, Journal.** Edinburgh. Vol. 1–18, New Series 1864–1920. illus., figs., plates (in color), charts, tables. Editors: Alexander Buchan an R. C. Mossman. **DWB, DLC**—The Scottish Meteorological Society, and its famous **Journa** like so many other influential societies and publications, owed its international reputation an its success to the efforts, the resourcefulness, the ability and above all to the longevity of on man: in this case Alexander Buchan, who was Secretary from 1864 to 1907, and who con tributed scores of outstanding climatological and meteorological articles to the Journal durin his forty active years. Of course the efforts of many other first rate scientists went into th organization of the Society, its network of stations which was almost as broadly conceived a that of the Palatinate Society, and into the success of its publication. John Stuart Forbe Thomas Stevenson (the father of Robert Louis Stevenson), and David Home helped foun the Society and contributed to the pages of its publication and in later issues appear excellen articles by C. K. M. Douglas, E. Gold, John Aitken, and many others.

In the first volume (July 1864) will be found an exceedingly interesting article by Forbe on the **Progress of Meteorology Since 1855,** wherein are enumerated the achievements an unsolved problems of this, the most productive era of the past century. Studies on sunspot and weather cycles, on ozone in the upper atmosphere, on the connection between magneti storms, the aurora and sunspots, on upper air temperatures and lapse rates to over 11 km., o organization of climatological, meteorological, marine, agricultural, and bioclimatologica research projects, and networks of climatic and synoptic stations, on global circulation patterns on the influence of the Gulf Stream on weather, on artificial production of rain in America (b burning prairie grass), on errors in rain gage readings due to poor exposure and eddies, o increased mortality during long periods of anticyclonic weather in winter, and hosts of othe investigations had been made by committees or were suggested for future study in this artic (which would need few changes to be accepted as a progress report at a meeting today).

Another interesting article in the July 1864 issue, by Thomas Stevenson, engineer, de scribes the Stevenson Screen, and ends with the characteristically practical note that this ne shelter costs only 15 shillings, a **saving of 15s.** over the old and unimproved model! The ne box would be fixed at a height of 4 feet above the ground, had louvered sides, and would b painted in the bargain. Detailed drawings accompany the brief article. In later article appear the first accurate climatological charts of the world, (by Buchan) based on actua observations, and done in several colors. During the final years of the publication (1916–192C appeared progress reports emphasizing the results of applications of meteorology to militar aviation, chemical warfare, gunnery, etc., and the advances made in theoretical meteorolog as a result of the benefits of aerial photography, upper air temperature and wind observation and more accurate synoptic analysis and more precise forecasts resulting from the militar efforts.

By the end of the First World War it became evident that a merger with the Royal Meteor ological Society was inevitable, since the Scottish Society was hard pressed to keep up eve its library and offices after the Meteorological Office in London took over the network c stations which had been operated for over half a century by the Society. The last volum ended in 1920 (published 1921) and the Societies were formally merged in Jan. 1921 (see **2–17**) *Subject Headings:* **Meteorology, Climatology, Societies, Periodicals, Scotland.**

2–4 551.5(06)

*Österreichische Gesellschaft für Meteorologie, Zeitschrift. Vienna. Band I–XX, 1866–1885. illus., plates, maps, diagrs. 23½x29½ cm. Author and title index of Vol. I–XX, 1896. 152 p. Editors: Carl Jelinek and Julius Hann. In German. **DWB, DLC**—The Austrian Meteorological Society was founded in Vienna in 1865, and at a meeting on November 16th of that year it was decided that a journal should be published by the society. In the first issue which appeared on May 1, 1866, a full account is given of the founding of the Society and other similar societies in Europe (since 1780 when the Societas Meteorologica Palatina was founded). At first the **Zeitschrift** came out 3 times a month, later twice a month, and in 1881 it was changed to a monthly in order to be able to publish more lengthy and worth while contributions. In 1886 it was merged with the **Meteorologische Zeitschrift** (2–8) of the Deutsche Meteorologische Gesellschaft and continued as a combined publication of the German and Austrian Societies.

Under the editorship of Prof. Julius Hann, it was natural that the **Zeitschrift** should assume a leading role in scientific meteorology and climatology, not only for Austria or perhaps Germany, but for the entire world. Papers on all phases of meteorology were published in every volume, including works by such famous men as Angot, Assmann, von Bezold, Dufour, Fritz, Hellmann, Hildebrandsson, Köppen, Mendeleff, Mohn, Nordenskjold, Perntner, Sprung, Wild, and Woeikof, to name only a few. The subject matter embraced synoptic, statistical, dynamic, instrumental, and aerological aspects of meteorology, and analytical climatic summaries, including tabular data for localities throughout the world. If one wants a climatic description of any place where observations had been taken during the past century, whether from Novaya Zemlya, Spitzbergen, the Indian Ocean, Vancouver Island, Mexico or Sakhalin Island, he need only check the index of the volumes of this Society and the chances are he will find more data than he would suspect had been compiled at such an early date. (Later similar treatises continued in the **Meteorologische Zeitschrift** and the **Annalen der Hydrographie.**)

Furthermore, every issue contained reviews of important books and articles which were being published in every language at that time. Correspondence from America, Russia, Scandinavia, etc., provides interesting reading even today. For instance, one learns that New York City was in consternation over the possibility of a decreased water supply if drought should prevail for some time, in view of the increasing population and water usage in that expanding metropolis. So the records made in New York from 1822 to 1871 were carefully analyzed and the conclusions published in the August 1874 issue of the **Zeitschrift.** Well analyzed synoptic charts and studies in synoptic climatology or applied meteorology give the articles of that time a very modern aspect. *Subject Headings:* **Meteorology, Climatology, Societies, Periodicals, Austria.**

2–5 551.5(06)

*Akademiia Nauk (St. Petersburg), **Meteorologicheskii Sbornik. Repertorium für Meteorologie.** Tom I.–XVII, 1870–1894. illus., charts, tables. Editor: Dr. Heinrich Wild. **DLC, DWB**—In 1859, Kämtz started a series under the sponsorship of the Imperial Russian Geographical Society, called **Repertorium für Meteorologie,** which ran for over 4 years and contained many excellent articles on meteorology and climatology. All of the material in this earlier series which was published at Dorpat (now Tartu) was in German or French. When Kämtz was called to St. Petersburg just before his death he became too much occupied with administrative affairs to continue editing this scholarly publication, so after 3 volumes had been issued, the journal lapsed. Dr. Wild was a close friend of Kämtz while the two were teaching and doing research in Switzerland during the 1850's, so at the first opportunity he started a periodical with the same name as Kämtz's. But to satisfy the Russian Academy which was demanding a Russian language publication, and to make instructions and data intelligible to those who did not know French or German, much of the material was published in either French and Russian or German and Russian. Later (in 1894) when the Academy demanded that only one language be used in the publication, and it was impossible for Wild to get first class contributions in Russian or to translate the German or French contributions into Russian, Wild gave up the whole business and stated that hereafter the Russians could publish their material in the regular Akademiia Nauk publications. After that it was many years before the meteorologists in Russia had their own publication again. However, during the twenty-

five years and in the seventeen volumes which were published, there appeared many important treatises on climatology, actinometry, synoptic meteorology, instruments, methods of observation, and allied subjects. A great deal of tabular data is included in nearly every article, and the first volume contains detailed instructions for observers; all of the necessary psychometric and meteorological tables, carefully elaborated; descriptions of meteorological installations and pictures of all kinds of equipment used at those stations. Six supplementary volumes were issued between 1877 and 1894, containing many exhaustive climatological treatises on various sections of the Russian Empire, all in Russian. Both series mentioned above were such carefully edited and thorough publications, and the material contained therein of such high quality that it proved impossible to continue these efforts without considerable subsidy from some well financed organization. Thus, with changes in administrative policy and economic conditions it was inevitable that the publication should die out when pressure became too great. *Subject Headings:* **Meteorology, Climatology, Societies, Periodicals, USSR.**

2–6 551.5(06)

***Annalen der Hydrographie und Maritimen Meteorologie.** Heft. 1–72, 1873–1944. illus., figs., charts, tables, graphs. Herausgegeben von der Deutschen Seewarte, Hamburg. All material in German. Published monthly. (At first entitled: **Hydrographische Mittheilungen.**) **DLC, DWB, MH-BH**—In spite of the fact that the purpose of this periodical was the publication of hydrographic material (data on tides, ocean currents, rivers and harbors, etc.), there is so much first class material which is of lasting interest to meteorologists that the Annalen ranks among the most important sources of articles or data in meteorology, climatology and oceanography. In the earlier years only about one out of four papers were on subjects allied to meteorology, but in the last decade of its existence (1935 to 1944) nearly three-quarters of the material was meteorological. The most striking feature of the series from the very beginning was the inclusion of elaborate (often colored) fold-in charts and tables in nearly every issue. Thus it was possible to present illustrative material on winds, ocean currents, ice conditions, rainfall, temperature, etc., of the type that is usually limited to irregular monograph series or the backs of hydrographic charts. These charts together with a large amount of detailed statistical and descriptive material, provide a first class source for analytical data on almost any problem which concerns the climatology or meteorology of the oceanic areas or adjacent coasts and islands from the Arctic to the Antarctic. The only better sources are the scientific results of meteorological and oceanographic expeditions which are not published, as a rule, for from 5 to 15 years after completion of each expedition.

In addition there are hundreds of short or medium length articles giving accurate observations of unusual phenomena encountered by seamen or scientists on voyages as well as on expeditions, including descriptions of typhoons, hurricanes, monsoons, observations of wind and weather at sea, and other accounts such as one would expect to find in any nautical publication. More unusual, however, are the many articles on secular variations in climate, not only of the oceanic areas but of the continents, and other studies obviously made by statistician who had available a large quantity of observational material and the time and facilities to compile it.

Although the old publication was allowed to lapse during World War II, a new journal Annalen der Meteorologie is being published in the British Zone of Germany (Hamburg) and the hydrographic portion of the old Annalen is now called **Deutsche Hydrographische Zeitschrift.** The latter contains a number of articles on meteorological oceanography as well as maritime meteorology, so in reality where one publication died, two new ones have now sprung up. *Subject Headings:* **Meteorology, Climatology, Oceanography, Hydrography, Periodicals, Germany.**

2–7 551.5(06)

The American Meteorological Journal. A Monthly Review of Meteorology, Vol. 1–12, 1884–1896. Editors: Mark Harrington, A. L. Rotch, and Robert DeC. Ward, Detroit, Boston, etc. **DLC, DWB, MH-BH—The American Meteorological Journal** was founded in May 1884 by Mark Harrington, at the time Prof. of Astronomy at Ann Arbor, Michigan. This was in the same year the famous **Meteorologische Zeitschrift** and **Das Wetter** were founded, and just 2 years after the Meteorological Society of Japan started its **Journal** which

is still being published. From the very beginning the **American Meteorological Journal** had difficulty meeting expenses, so that Harrington and later Rotch and Ward were forced not only to donate most of their time as editors, but to make up the financial deficit out of their own private resources. When Prof. Harrington in July 1891 was appointed to be the first Chief of the newly formed U. S. Weather Bureau the editorship was transferred from Detroit to Boston, where for the next 4 years R. DeC. Ward, Professor of Meteorology at Harvard kept the journal going with some help from the New England Meteorological Society. During this period the Journal had an impressive board of consulting editors, including Harrington, Rotch, Cleveland Abbe, William Morris Davis, and Oliver Fassig, all of whom helped by contributing worth while articles. In addition there were contributions from Clayton, Ferrel, and Loomis. It was a matter of deep regret to Prof. Ward that a country like the United States which could produce men like Franklin, Redfield, Espy, Maury, Henry, Ferrel, Loomis, and other meteorologists of world wide fame, could not support an independent meteorological journal or society at a time when such societies and journals were springing up and thriving in England, France, Germany, Scotland, and even Japan. But with the expiration of the Journal and the incidental folding-up of the New England Meteorological Society, America went without an independent or unofficial outlet for meteorological treatises for a quarter of a century; until in 1920, when Dr. C. F. Brooks sparked the present society which now boasts of 4,000 members and at least 3 thriving publications.

The content of the **Journal** resembled in many ways that of the **Bulletin** during the period from 1920 to 1940, containing a variety of material ranging from long articles of the highest quality to short notes, reviews, abstracts, translations, and notices of contents of foreign periodicals, sketches of instruments, correspondence and accounts of interesting weather occurrences. There were several long articles giving the history or progress in meteorology, articles on education along meteorological lines, and pleas for an American meteorological society. *Subject Headings:* **Meteorology, Periodicals, United States.**

2–8 551.5(06)

*Deutsche Meteorologische Gesellschaft. **Meteorologische Zeitschrift,** Vol. 1–61(7), 1884–1944 (July). Editors: Hann and Köppen (1884–1892), Hann and Hellmann (1892–1907), Hann and R. Süring (1907–1920), F. M. Exner and R. Süring (1921–1930), W. Schmidt and R. Süring (1931–1936), and R. Süring and Steinhauser (1937–1944). **DWB, DLC, MH-BH**— The best known and most widely read of the several enduring German language periodicals in the field of meteorology owed its reputation and durability to the equally famous editors who carried it through from 1884 to 1920 with little change in editorial policy or quality of publication. The renowned climatologist W. Köppen, founded the **Meteorologische Zeitschrift** with the support of the German Meteorological Society, and 2 years later the journal was strengthened by the "Anschluss" with the **Zeitschrift** of the Austrian Society and the contribution of the more experienced editor, Julius von Hann who was equally famous as a meteorologist, climatologist and editor. Although articles were always printed in German, contributions came in from all over the world, and it would be useless to even begin to name any of the important contributors as they would comprise a catalogue of all of the foremost contributors to the science of meteorology in the past century. Essentially they are the same as were found in the **Zeitschrift** of the Austrian Society (see 2–4) except that as the decades went by new names became famous, some of the old ones dropped from the literature, but many continued for forty or fifty years to publish classical papers in this journal.

The subject matter, likewise, covered the entire field of meteorology, climatology, and the peripheral sciences, with articles of all lengths and degrees of exhaustiveness. A high percentage of the contributions were accompanied by statistical or illustrative material of various types. Every issue contained reviews or bibliographies of books, monographs, and periodical literature published in every country. None of the periodicals which have sprung up in the Soviet, British, French or American zones of Germany quite come up to the standard maintained by the Meteorologische Zeitschrift. Probably the **Zeitschrift** owed some of its success in the early years to the impetus given to meteorology at that time by the International Polar Year (1883) and the eruption of Krakatoa in the same year; both events calling attention of scientists to the universality of interest in meteorology and the essentially international

character of meteorological phenomena. *Subject Headings:* **Meteorology, Climatology, Societies, Periodicals, Germany.**

2–9 551.5(06)

Zeitschrift für Angewandte Meteorologie. Monatsschrift für Witterungskunde. **Das Wetter.** [Zeitschrift for Applied Meteorology, Monthly Journal for Weather Science. The Weather.] Founded and edited until his death by Dr. R. Assmann (1884–1915) and later by the Pepplers, (A. & W.). Vol. 1–61, 1884–1944. illus., figs., synoptic charts, tables. Magdeburg, Leipzig. **DWB**—Dr. Assmann, who invented the Assmann psychrometer and was co-discoverer with Teisserenc de Bort of the stratosphere, was very much interested in applied meteorology; that is in agricultural, medical, and popular meteorology and climatology, as well as in all phases of theoretical science. The need in Germany for a monthly periodical similar to **Symons's Meteorological Magazine** was foreseen by Assmann, and his foresight was amply rewarded by the popularity of **Das Wetter.** Hundreds of short, semi-popular articles giving accounts of weather phenomena all over the earth, and an occasional longer contribution giving the development or progress in some field of meteorology, or the history of some famous personage, (usually run in serial form) can be found in looking over the many volumes of this periodical. The title **Zeitschrift für Angewandte Meteorologie** was assumed in 1928 while A. & W. Peppler were editors. Beginning with 1930 the journal was published by the Akademische Verlagsgesellschaft, Leipzig, the publishers of the **Beiträge zur Physik der freien Atmosphäre,** and of **Gerlands Beiträge zur Geophysik.** Among the important contributors were Hellmann, Meinardus, Köppen, Defant, Karl Knoch, Süring, A. and K. Wegener, Maurer, O. Meissner, Karl Keil, H. Ahlmann, Schmauss, and Schwerdtfeger. Many of the articles, including interesting accounts of weather phenomena all over the earth, were written by the editors themselves. *Subject Headings:* **Meteorology, Periodicals, Germany.**

2–10 551(06)

Beiträge zur Geophysik. Band 1–60. 1887–1944. (Author and Subject Index, Band 1–35, 1933.) Editors: Dr. Georg Gerland, Stuttgart, and V. Conrad, Vienna. Corresponding editors: Abbott, Ångström, Berlage, van Everdingen, Fleming, Gutenberg, Köppen, Linke, Störmer, Vegard, Weickmann, etc. **DWB, DLC**—Although **Gerlands Beiträge** contained a great deal of material in fields of geophysics which are not directly of interest to meteorologists, the volumes of this journal comprise one of the leading sources of fundamental scientific articles on climatology, hydrology, oceanography, glaciology, astrophysics, radiation, seismology, and terrestrial magnetism; all of which are rich in applications to meteorology. Reviews which were contributed by leading meteorologists all over the world, occupy a large portion of each issue, and several pages of classified bibliographies appeared regularly, covering the best works in every country. Most articles were in German, but there were many in English, French, Italian, Swedish, etc., with summaries in one or more languages. The editing, illustrative material, tables, printing and binding were all of high quality. Contributors in addition to the editorial advisors listed above, include Baur, Braak, H. Berg, V. & J. Bjerknes, Defant, Eredia, Ertel, Findeisen, Fujiwhara, Gorczyński, Gherzi, Götz, Haurwitz, Hobbs, Kalatin, Landsberg, Palmén, Wegener, and scores of others. Other exhaustive treatises in the same fields and by some of the same authors appeared in the Supplemental Volumes, in **Ergebnisse der Kosmischen Physik** (1931–1940) and in the parallel series called **Beiträge zur Angewandten Geophysik,** (1930–1943), [Contributions on Applied Geophysics.] The contributions in the series begun by Gerland are outstanding for their thoroughness, not only in covering the subject and literature, but in wealth of supporting data, charts, theoretical background, and illustrative material, and finally as a source of bibliographies. As yet no publication has appeared since the war which quite takes the place of **Gerlands Beiträge,** so the news that it will be resumed in 1950, is welcome. *Subject Headings:* **Geophysics, Meteorology, Hydrology, Oceanography, Periodicals.**

2–11 551.5(06)

***Beiträge zur Physik der freien Atmosphäre.** Band 1–27, 1904–1942. illus., figs., charts, tables. Published by the Akademische Verlagsgesellschaft in Leipzig. **DWB, DLC**—The only other journal in the field which equalled **Gerlands Beiträge** for excellence of editing and

publishing, for the quality of the contributions and the universality of the contributors was **Beiträge zur Physik der freien Atmosphäre.** It was founded in 1904 by R. Assmann and H. Hergesell, the directors of the Lindenberg Observatory near Berlin (which did so much to foster upper air research during its brief existence). Although the observatory did not continue after the First World War, the journal became more and more popular, received contributions from all over the world, and printed articles in many languages. The editorial board was international in scope, and numbered the same men as were on the board of **Gerlands Beiträge,** and in addition some who were principally interested in meteorology and aerology rather than in other lines of geophysics. For instance Hesselberg, Moltchanoff, Okada, Patterson, Simpson, Sutton, Walker, Dines, Hann, Shaw, and Gregg were at one time or another on the board of editors. Essentially, the editors and contributors to this publication were those who were on the International Meteorological Organization Commission on Aerology. In addition, the journal had the backing of the Deutsches Meteorologisches Institut und Observatorium, and the International Commissions on Aviation and Aerology. The subtitle which appeared in the first edition indicated clearly that the purpose of the journal was that it should be the **Zeitschrift für die Wissenschaftliche Erforschung der höheren Luftschichten,** [Journal for the Scientific Investigation of the Upper Atmosphere].

In the early issues were many papers giving statistical results and analyses of kite and sounding balloon ascents in various regions or situations. Later came fundamental papers on pilot balloon techniques and results (1912–1914), and in the early 1930's appeared the first articles on radiosonde construction and methods of observations, and the actual results obtained in various regions. Papers on the structure of cyclones, anticyclones, hurricanes, trade winds, cloud formation and structure, föhns, the tropopause, moazagoatl clouds, noctilucent clouds, altimetry, etc., and the aerological results of oceanographic, arctic and other expeditions are to be found in every volume. Besides articles written by the above mentioned editors, are excellent papers by Bleeker, Ekhart, Kleinschmidt, Küttner, Palmén, Peppler, Lange, Duckert, Sverdrup, Schmauss, Väisälä, and dozens of others. The journal appeared once or twice a year before 1930 and four or more times a year from 1931 to 1942. *Subject Headings:* **Meteorology, Aerology.**

2–12 551.5(06)

Taylor Instrument Companies, Rochester, New York. **Tycos Rochester.** (Title varies.) Vol. 1–32, 1910–1942. Editor: F. M. Herrick. A quarterly, illustrated, popular trade magazine comprising about 40 pages in each issue. **DWB, DLC**—For thirty years **Tycos** was one of the most attractive meteorological publications in the world, with many beautiful colored covers, hundreds of excellent photographs of snow and cloud scenes, unusual phenomena such as tornadoes, hailstones, lightning, etc., and numerous pictures of instruments, instrumental exposures and meteorological installations all over the globe. The magazine, printed on slick paper, contained only a few pages of advertising matter, so that over 90% of the space was devoted to original popular articles on all branches of applied meteorology, and to short newsy items about personalia, history, unusual weather occurrences and so on, from every continent. Among the contributors are noted the names of Charles Marvin, C. G. Abbot, J. R. Lloyd, I. R. Hand, C. F. Talman, Willis Hurd, S. D. Flora, T. A. Blair, C. F. Brooks, J. C. Alter, and even well known meteorologists in Germany, Poland, Hungary, and Japan contributed. The material contained in this journal was especially useful for students and teachers in schools and colleges, for cooperative observers, for marine observers and even for career meteorologists, especially those interested in instruments and methods of observation or those in out of the way places. The exigencies of the Second World War, unfortunately, forced the periodical to appear less often and finally to stop altogether. Similar journals have appeared since the war, namely Weatherwise in the United States and Weather in England. *Subject Headings:* **Meteorology, Periodicals, Photography, United States.**

2–13 551.5(06)

La Meteorologia Pratica—Rivista di Meteorologia e Scienze Affini. (Title varies.) Vol. 1–21, 1920–1940. Bi-monthly. Index 1920–1928 (in 3 vol.). All articles in Italian. **DWB**—Started as an expansion of the **Bulletin** of the Montecassino Observatory in the 12th year of the latter publication, this journal began with Vol. 1, No. 1 in Jan.–Feb. 1920 and ended with

Vol. 21, (5/6), Sept.–Dec. 1940. The journal compares in many ways with the **BAMS,** the **Meteorological Magazine** or **Das Wetter,** although it is slanted more toward agricultural meteorology and bioclimatology than the latter three were in recent years. It contains popular and descriptive scientific articles, reviews, and cumulative bibliographies of Italian publications. Among the better known contributors were Gorczyński, Rossi, Eredia, Gamba, Kiriakov, and Azzi. Subject matter comprised, in addition to agricultural and medical meteorology, articles on radio-electric and aeronautical meteorology, hydrology, terrestrial magnetism, maritime and mountain meteorology. A few diagrams, illustrations and tables give some support to the predominantly descriptive textual material. *Subject Headings:* **Meteorology, Climatology, Periodicals, Italy.**

2–14 551.5(06)

Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby (pri Sovete Ministrov SSSR) **Meteorologiia i Gidrologiia.** Gidrometizdat. Moscow-Leningrad. 1936–1949. (1941–1945 missing), 1946 and 1947 have added to title **Informatsionnyi Sbornik.** Editors: N. N. Gribanov and L. K. Davydov. illus., figs., tables, bibliographies. **DLC, DWB**—These few volumes contain a large number of articles on scientific and applied meteorology, hydrology, oceanography, etc., and the meteorological articles are heavily weighted on the side of dynamic and synoptic meteorology. Although the reproduction of charts and figures is not up to the standards of the higher quality German publications, a larger circulation justified use of cheaper paper and the resulting sacrifice in appearance. Many shorter contributions on agricultural meteorology, methods of observation, instruments, history, statistical climatology, long range forecasting, illumination, aerology, actinometry, local forecasting, flood forecasting, etc., are to be found. In most of the volumes the titles of the articles, which are all in Slavic (Cyrillic) characters, are translated into English. Articles by Askanazii, Kuz'min, Koloskov, Kalitin, Pinus, and Multinovsky will be found in earlier numbers. In it we find that Multinovsky died on March 4, 1938. Many of the authors give evidence in their lists of references to having covered the best known articles in the English, Scandinavian or German literature. Others stick to purely Russian sources. This journal is a continuation of the well-known **Meteorologicheskii Vestnik** (1891–1935) issued by the Imperatorskoe Geograficheskoe Obshchestvo (after the Revolution the Vsesoiuznoe Geograficheskoe Obshchestvo). *Subject Headings:* **Meteorology, Hydrology, Periodicals, USSR.**

2–15 551.5(06)

Journal of Aeronautical Meteorology. Kansas City. Vol, 1–2, Oct. 1944–Oct. 1946. illus. Editor: E. J. Minser. **DLC, DWB**—During the war it became obvious that the United States needed a journal which would provide an outlet for articles on aeronautical meteorology and airways forecasting. This journal was sponsored by the Meteorological Committee of the Air Transport Association of America, and appeared as a well-illustrated, pocket-size quarterly which at first gave great promise of filling the above mentioned need. Many articles on map analysis, and on thunderstorm, tornado, hail, upper air wind, hurricane, icing, fog, and stratus forecasting as well as local forecasting were furnished by professional meteorologists both inside and outside the government and military services. Some of the contributors were: V. E. Jakl, J. J. George, Donald Ives, C. E. Buell, D. M. Crowley and D. G. Linklater, as well as many other airways meteorologists. Only seven issues appeared between October 1944 and October 1946. The excuse given for the discontinuance of this promising journal was its merging with the Journal of Meteorology which began about the same time and which proved to have a much broader appeal and a sounder backing. *Subject Headings:* **Aeronautical meteorology, Periodicals, United States.**

GENERAL METEOROLOGY

2–16 551.5:06:551.521

†Ångström, Anders, **Survey of the activities of the Radiation Commissions of the International Meteorological Organization and of the International Union of Geodesy and Geophysics.** Tellus, 1(3):65–71, Aug. 1949. 96 refs. (List of reports given at various meetings.) **DWB**—A comprehensive account of the history and functions of the two actinometry com-

missions (IMO & IUGG), the errors of the principle types of actinometers, need for standardization of instruments, methods, units and terminology, and finally a list of about 100 references to important work in all countries pertinent to the work of the two commissions in which the author is vitally interested. *Subject Headings:* **Meteorological organizations, Radiation.**

2–17 551.5:06(09)

Wedderburn, Ernest, **The Scottish Meteorological Society.** Royal Meteorological Society, Quarterly Journal, 74(321–322):233–242, July–Oct. **1948. DWB**—An account of the Scottish Meteorological Society from its foundation in 1855 until it was amalgamated with the Royal Meteorological Society on Jan. 19, 1921. Sir John Stuart Forbes, David Milne Home, and Thomas Stevenson (the father of R. L. Stevenson), were active in organizing the society as well as a network of meteorological stations for agriculture and commerce. This network was taken over by the Meteorological Office in 1920. The outstanding figure in Scottish meteorology was, however, **Alexander Buchan,** who worked unceasingly from 1860 to 1907 to further the interests of the Society and its publications. The network of stations was famous throughout the world; there being 50 stations in Scotland, one in the Faroes, two in Iceland and one in Brazil, and 3 of the stations were on mountains. Observers on Ben Nevis transmitted observations by pigeon for use by forecasters, prior to establishment of a telephone line to the summit. Important research work, especially for fisheries and public health, was done by the Society. *Subject Headings:* **Meteorological organizations, History, Scotland.**

2–18 551.5:621.396(04)

Davis, Francis K. Jr., **The professional meteorologist in radio,** American Meteorological Society, Bulletin, 30(3):86–89, March **1949.** photo. **DWB**—The problem faced by a professional weather broadcaster in popularization of dry facts and elaboration on forecasts: a compromise between the spheres of science and entertainment. Examples of responses from the listening public are quoted. *Subject Headings:* **Professional meteorologists, Weather broadcasts.**

2–19 551.5:92

†Keil, Karl, **Wilhelm von Leibnitz und die Meteorologie.** [Wilhelm von Leibnitz and meteorology.] Meteorologische Rundschau, 1(11–12):321–322, May–June **1948,** 14 refs. **DWB**—Quotations from a number of sources are given to support the claim that Leibnitz (in 1677) made the first instrumental observations of meteorological elements (pressure and temperature) in Germany. He also (in 1700) recommended that the Czar be asked to help establish a chain of meteorological, magnetic, and astronomical observatories from the eastern boundaries of Germany across Russia and Siberia to China. [Tikhomirov (1930) claims that this was actually done in the year 1733, although the effort did not continue very long. ed.] *Subject Headings:* **Meteorological observations, Biography, History.**

2–20 551.5:519.2

Bartels, Julius, **Null kann vier bedeuten.** [Zero may equal four.] Annalen der Meteorologie, 2(1–2):44–48, Jan.–Feb. **1949.** fig., 3 refs. Summary in German and English p. 44. **DWB**—The author discusses, on the basis of the binomial theorem, the probability of getting at least one case of no occurrence of a phenomenon in a given number of trials, with different mean frequencies of occurrence of the phenomenon. In meteorological series the probability of no occurrence is greater, because of persistence, than with independent occurrences. *Subject Headings:* **Probability theory, Statistics in climatology.**—*C.E.P.B.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

OBSERVATIONS

2–21 551.501.4:551.55

Canada, Dept. of Transport, Meteorological Div., (ed: Andrew Thompson), **Observing the wind at sea.** Cir. 1592 OBS-87, March **14, 1949.** 6 p. 2 figs., 5 tables, 3 refs. **DWB**—Instructions for determining true wind from state of sea, smoke, etc., for a moving ship.

Estimates from sea state, considered more reliable than from anemometers. Method of correcting apparent wind to get true wind given tabularly and graphically. *Subject Headings:* **Methods of observation, Winds.**

2–22 551.501.7

Friend, Albert W., **Theory and practice of tropospheric soundings by radar.** Institute of Radio Engineers, Proceedings, 37(2):116–138, Feb. **1949.** 17 figs., 29 refs., 117 equations. **DWB**—Comprehensive analysis of results of 13 years study on soundings by means of high-powered, sharply beamed microwave radar systems. Echoes from air-mass boundaries as well as precipitation, turbulence and dust areas make it possible to supplement data obtained from radiosonde ascents and ceilometers. Photographic recording makes much more sensitive detection of echoes. Samples shown. Theoretical development indicates sharp echo effects are produced almost entirely by dielectric transition and deviation layers of thickness of the order of one wave length or less. Conclusion that a set of three vertical beam systems for simultaneous and continuous sounding and recording of echoes could supply data with high-gain antenna systems of perhaps 400, 4,000 and 40,000 mc.: the first, for recording major air-mass boundaries; the second, for fine-structure effects and dense precipitation regions; the third, for detection of smallest concentrations of most minute precipitate or dust particles. (Partly from author's abstract.) *Subject Heading:* **Upper air soundings.**

2–23 551.501.7:551.508.19: 551.593.7

Romantsov, I. I., **Issledovanie troposfery s pomoshch'iû prozhektornogo lucha.** [Research on the troposphere by means of beams of light.] Akademiîa Nauk, SSSR, Izvestiîa, Ser. Geogr. i Geofiz., 12(5):421–438, **1948.** 11 figs., 6 tables, 16 refs. **DWB, DLC**—Layers of stability or instability can be detected or photographed by means of a beam of light and measurements of the polarization and intensity of the reflected light. Can be used to determine conditions in troposphere and also the tropopause. Many observations taken on clear nights in 1944 and 1945. Equipment described, methods of observation, theoretical considerations, individual soundings illustrated and data integrated. *Subject Headings:* **Upper air observation, Polarization.**

2–24 551.501.7:797.5

Raspet, August, W., **The sailplane as a meteorological probe,** American Geophysical Union, Transactions, 29(5):631–637, Oct. **1948.** 8 figs., 8 refs. Abstract p. 631. **DWB**—Aerodynamic characteristics of the sailplane make it a meteorological instrument in itself as well as a carrier of instruments. Aerodynamic characteristics of various sailplanes, design of and performance of instruments installed for meteorological recording, and theodolite techniques for tracking the sailplane and computing turbulence are discussed and illustrated. Usefulness in determining electric field inside thunderstorms, and possibilities of tracking by radar or telemetry are advanced. *Subject Headings:* **Methods of observation, Sailplanes.**

2–25 551.501.9:551.510.42

Weather towers near completion at Brookhaven Laboratory. Franklin Institute, Journal, 246(3):269–270, Sept. **1948. DWB**—Brief article in Current Topics describing meteorological project in connection with atomic energy project. Main purpose to study dissipation of harmful gases. *Subject Headings:* **Observatories, Atmospheric pollution.**

INSTRUMENTS

2–26 551.508:551.585.7

Küttner, Joachim, **Messprobleme auf Bergstationen.** [Problems of observation at mountain stations.] Meteorologische Rundschau, 2(1–2):37–41, Jan.–Feb. **1949.** 4 figs. 3 refs. Summary in German p. 37. **MH-BH**—The difficulties in measuring temperature and humidity are: ventilation, neighborhood of buildings, radiation, differences between windward and leeward sides, eddy clouds, icing of thermographs and drift snow; electrically aspirated thermographs are best. Rainfall measurement suffers from vertical currents, rime and drift snow. Anemometers are disturbed by adherence of snow, inclined winds and leeside whirls; a funnel free to move in three dimensions is recommended (Pendel-Prandtl-Rohr). Existing

instruments are insufficiently protected. Barometers are almost useless in storms (errors exceed 4 mm.). Help is required from instrument makers. Comments on this article are made by E. Reichel: **On the question of measurements at summit stations.** idem, p. 41–42. *Subject Headings:* **Methods of observation, Mountain meteorology.**—*C.E.P.B.*

2–27 551.508.21

Nicolet, M., **Quelques problèmes fondamentaux pour les études de la radiation.** [Some fundamental problems for the study of radiation.] Journal Scientifique de la Météorologie, 1(1):1–13, Jan.–March **1949.** 7 figs., 2 refs., equations. Summary in French, English and Spanish p. 1. **MH-BH**—A theoretical and practical discussion of origin and correction of errors in various types of radiation measurement techniques and various instruments. An "effective penumbra factor" should be introduced into calculations based on recordings through an angular aperture. *Subject Headings:* **Actinometers, Radiation measurements.**

2–28 551.508.822

Brailsford, H. D., **A new code transmitting radiosonde.** Journal of Meteorology, 6(5):360–362, Oct. **1949.** 5 figs., ref. **DWB**—A description of the "Codesonde," a device suggested by J. M. Brady and used during the war by the U. S. Signal Corps for sending Morse code signals of meteorological elements as taken from a phonograph record disc to a receiver which reproduces record. Accuracy compares favorably with audio-modulated radiosondes and aerometeorograph records. Equipment is illustrated. *Subject Heading:* **Radiosondes.**

2–29 551.508.822

Gödecke, Karl, **Die Strahlungsfehler der Bimetalle bei aerologischen Messgeräten.** [The radiation error of the bi-metallic (thermometer) in aerological instruments.] Annalen der Meteorologie, 2(1–2):18–24, Jan.–Feb. **1949.** 6 figs., 17 refs. Summary in German and English p. 18. Ulrich, Karl Otto, **Statistische Untersuchung des Strahlungsfehlers der Graw'schen Wettersonde.** [Statistical investigation of the radiation error of the Graw radiosonde.] idem., p. 25–28. fig., 3 tables, 3 refs. Summary in German and English p. 25. Abild, Bruno, **Der Strahlungsfehler bei der Graw'schen Wettersonde.** [Radiation error of the Graw radiosonde.] idem., p. 28–29. fig., 2 tables. Summary in German and English p. 28. **DWB**—These three papers examine the radiation errors of the German Graw radiosonde by comparing records during ascent and descent and during day and night (allowing for diurnal variation). The results are all similar; the errors increase with elevation of the sun from 0° to 60°, and with height:

Heights, mb.	300	200	96	70	50
Error, °C.					
Winter	0.3	0.5	1.2	2.5	4
Summer	0.5	1.0	3.5	4.5	5

The errors are similar to those in the Väisälä. *Subject Headings:* **Radiosondes, Instrumental errors.**—*C.E.P.B.*

2–30 551.508.822:551.54

Hinzpeter, Max, **Die Luftdruckmessung der Grawschen Wettersonde und ihre instrumentell bedingte Korrektion.** [Air pressure measurements with the Graw radiosonde and their instrumental correction.] Meteorologische Rundschau, 1(15–16):483–488, Sept.–Oct. **1948.** 5 figs., table, refs., 11 equations. Summary in German and English. **DWB**—A detailed consideration of the lag of the pressure element due to temperature effect, hysteresis and back-lash. The correction formula is introduced and elaborated into tabular and nomogram form. Comparison of steel and beryllium aneroid capsules given; also magnitude of error after corrections are applied. *Subject Headings:* **Radiosondes, Instrumental errors.**

2–31 551.508.822

Woelfle, Friedrich, **Eine Radiosonde mit Widerstandsthermometer.** [A radiosonde with resistance thermometer.] Meteorologische Rundschau, 2(3–4):99–100, March–April **1949.**

fig. Summary in German p. 99. **MH-BH**—The incorporation of a resistance thermometer in the bridge system and the use of a null-point method give greater accuracy. *Subject Heading:* **Radiosondes.**—*C.E.P.B.*

2–32 551.508.5

Corrsin, Stanley, **Extended application of the hot-wire anemometer.** Review of Scientific Instruments, 18(7):469–471, July 1947. refs. **DWB, DLC**—Use of hot-wire anemometer in determination of fluctuations in velocity and temperature, in turbulent flow with heat transfer, and of mean relative concentration in mixing of gases. *Subject Heading:* **Anemometers.**

2–33 551.508.7

Falconer, Raymond E., and Schaefer, Vincent J., **A new plane model cloud meter.** General Electric Research Laboratory, Occasional Report No. 2, Project Cirrus. Schenectady, N. Y., May 15, 1948. 10 p. 6 figs., table, refs. **DWB**—Instrument consisting of glass cloth tape and recording device for quick recording of liquid water content in clouds during airplane flights. Tested in wind tunnel and gave fair accuracy. *Subject Heading:* **Cloud meters.**

2–34 551.508.7:551.576.11

Malkus, W. V. R., Bishop, R. H., and Briggs, R. O., **Analysis and preliminary design of an optical instrument for the measurement of drop size and free-water content of clouds.** U. S. NACA Technical Note No. 1622, p. 1–60, June 1948. **DWB**—*Subject Headings:* **Cloud meters, Cloud structure.**

2–35 551.508.7

Puck, Theodore T., **An automatic dew point meter for the determination of condensable vapors.** Review of Scientific Instruments, 19(1):16–23, Jan. 1948. 5 figs., table, 5 equations, 15 refs. **DWB, DLC**—A method for determination of very small concentrations of condensable vapors by measurement of the decrease in reflectivity of a cooled surface on which the vapor has been deposited, is described and illustrated. Details of construction, operation and calibration given. Used in hospitals to determine concentration of germicidal vapors in prevention of air-borne disease, and in investigating kinetics of condensation of vapors in atmospheric nuclei. *Subject Headings:* **Dew-point recorders, Medical meteorology.**

2–36 551.508.71

Brewer, A. W., Cwilong, B., and Dobson, G. M. B., **Measurement of absolute humidity in extremely dry air.** Physical Society, London, Proceedings, 60, Part I (337):52–70, Jan. 1, 1948. 6 figs., 4 tables, 11 refs. **DWB, DLC**—Dew point hygrometer developed to meet need for humidity measurements within 1% accuracy down to frost points of −90°C. to be used in upper air soundings. History of instrumentation Deposition of water vapor at very low temperatures; description and use of hygrometers; laboratory tests of the instrument; frost point hygrometer with photoelectric deposit indicator. Below −90°C. it is not possible to operate a frost point hygrometer because the deposit is in the form of an invisible glassy layer but the instrument gives correct results at temperatures close to this limit. *Subject Heading:* **Hygrometers.**

2–37 551.508.71

Humidity test apparatus. Heating, Piping, and Air Conditioning, 21(2):109, Feb. 1949. **DWB**—Testing device developed at National Bureau of Standards for research, calibration and testing of hygrometers at temperatures below freezing. Developed for Bureau of Ships for testing radiosonde hygrometer elements. Humidities within 3% can be determined. *Subject Heading:* **Hygrometers.**

2–38 551.508.71

Moisture determination by electrolytic film. National Bureau of Standards, Technical News Bulletin, 32(2), Feb. 1948. fig. **DWB**—Small amounts of water vapor in gases may be determined rapidly and with great sensitivity by the change in electrical resistance of an electrolytic film as it absorbs moisture. The film is spread over the surface of a solid insulator

between metallic electrodes in a pressure-tight enclosure. Changes in resistance are indicated by variations in the meter. Not recommended for high humidities, but for sensitive measurements in small places difficult of access. *Subject Heading:* **Humidity instruments.**

2–39 551.508.71

Schirmer, Hans, **Messung der Lufttemperatur mit dem Aspirationspsychrometer von Assmann.** [Measurements of air temperature with the Assmann aspiration psychrometer.] Meteorologische Rundschau, 2(1–2):42–45, Jan.–Feb. **1949.** 3 figs., 13 refs. Summary in German p. 42. **MH-BH**—The author investigates Assmann's original assumptions about the aspiration psychrometer as applied to new types. The lag of any thermometer increases by 50–60 per cent when placed in the instrument. Ventilation-time curves of various types are found for winds of different speeds and with the axis in different relations to the wind direction. It is concluded that the modern types are efficient. *Subject Heading:* **Psychrometers.**—*C.E.P.B.*

2–40 551.508.71

Troeger, Heinz, **Die Ausdehnung des Hygrometer-Haares.** [The extension of the hygrometer hair.] Meteorologische Rundschau, 2(3–4):103, March–April **1949.** table, equation. **MH-BH**—The author compares Gay-Lussac's measurements with an empirical hyperbolic formula, and finds agreement within 0.4% above 40% relative humidity. Below 40% the agreement is less good. *Subject Heading:* **Hygrometers.**—*C.E.P.B.*

2–41 551.508.762

Hanle, Wilhelm, and Schmillen, Albert, **Messung der Wolkenhöhe mit dem Scheinwerfer bei Tage.** [Measurement of cloud heights by day with cloud searchlights.] Meteorologische Rundschau, 2(3–4):97–99, March–April **1949.** 3 figs., equations. **MH-BH**—Measurements of cloud height by day can be made by observing a modulated beam from a vertical cloud searchlight with a photocell. The illumination is only 10^{-4} to 10^{-5} of daylight, but the modulation makes it perceptible. The illuminated area is reflected by a mirror into a horizontal receiver (wiring diagram given) only 220 meters from the searchlight. *Subject Heading:* **Ceiling projectors.**—*C.E.P.B.*

2–42 551.508.77

Rossman, Clark G., **The Hudson design—Jardi type recording rain intensity gauge and rainfall totalizer.** American Meteorological Society, Bulletin, 30(3):97–103, March **1949.** 8 figs. **DWB**—Description of a new type of recording rain gage which makes a continuous trace of rainfall intensity similar to the wind record from a Dynes Anemograph, and in addition makes an independent record of rainfall amount by means of tipping buckets. The collector is 5½ feet in diameter; the operation entirely mechanical to provide continuous records in case of power failure. Entire mechanism and assembly described and illustrated in detail. *Subject Heading:* **Rain gages.**

2–43 551.508.79:621.396.9

Jones, F. E., **Radar as an aid to the study of the atmosphere.** Royal Aeronautical Society, Journal, 53(461):433–442, May **1949.** 9 figs., 6 refs., equations. Summary p. 433, discussion p. 442–448. **DLC**—A brief, but technical, summary describing and illustrating the various uses of radar and pulsed violet or ultraviolet light in meteorology; the difficulties encountered and the problems which may be solved by using improved equipment and techniques. Since the war, radar has been used extensively in America and to a lesser extent by Great Britain to detect storms and precipitation areas in both horizontal and vertical planes; to measure cloud heights and distances; to measure wind direction and speed and atmospheric density to great heights. Unsolved problems are the use of radar in measuring turbulence during precipitation, Döppler frequencies produced by moving rain drops, study of "angels" or echoes from apparently clear sky, and in the improvement of upper air soundings of temperature and humidity. Discussion by Sir Robert Watson-Watt, President of the Royal Meteorological Society, by Dr. Scrase, N. E. Rowe, Gordon Hughes, A. C. Clarke, E. Gold and others, and

replies by the author are given. Equipment is illustrated in detail. *Subject Headings:* **Radar meteorology, Instruments.**

2–44 551.508.79:551.09:621.396.9

Radar turned to weather forecasting. Engineering News Record, 142(7):58–59, Feb. 17, **1949.** 2 figs. **DWB**—Popular description for engineers of operation of radar in detecting storms, hurricanes, etc. Limitations due to curvature of earth and attenuation beyond 40 miles or so. Commercial value where operations are affected by surprise storms. Gives better coverage than rain-gage network for area of 8,000 sq. mi. *Subject Headings:* **Radar storm detection, Weather forecasting.**

2–45 551.508.94:551.594.6:621.396:551.501

Location of thunderstorms by radio. Nature, [London], 163(4132):75, Jan. 8, **1949.** 4 refs. **DWB**—Storm location network of the Meteorological Office in the British Isles and "sferics" apparatus employed, described. *Subject Headings:* **Radar storm detection, Thunderstorms, Methods of observation, Networks.**

2–46 551.508.92

Cherniavskii, E. A., **Dal'nost' vidimosti i eë geofizicheskie kharakteristiki.** [Visibility and its geophysical characteristics.] Akademiîa Nauk, SSSR, Izvestiîa, Ser. Geogr. i Geofiz., 12(5):405–420, **1948.** 14 figs., 7 refs. **DWB, DLC**—A method for determining visibility, either at night or in the daytime, by means of measurements of the intensity of dissipation of an electric charge from an apparatus exposed in the free air at one point This method is compared with results obtained from a turbidity meter, and it is stated that good agreement exists. Work done under varying cyclonic and climatic conditions. Apparatus illustrated and many curves show correlation between different methods, and under differing conditions. Tested at Tashkent and Irkutsk observatories. *Subject Headings:* **Instruments, Visibility.**

SYNOPTIC ANALYSIS AND FORECASTING

2–47 551.509.1

Bleeker, W., and Bleeker, F. J., **Berichten uit de weerkamer.** [Reports from the weather bureau.] Hemel en Dampkring, 45(10):165–169, Oct. **1947.** 4 figs., (including map of telecommunications network of Netherlands). **MH-BH, DLC**—*Subject Headings:* **Synoptic charts, Transmission of reports.**

2–48 551.509.317:551.509.33

Charney, J. G., and Eliassen, A., **A numerical method for predicting the perturbations in the middle-latitude westerlies.** Tellus, 1(2):38–54, May **1949.** 13 figs., 2 tables, 9 refs., 45 equations. Abstract p. 38. **DWB**—Work done at the Institute for Advanced Study at Princeton on effect of friction in modifying the motion of the quasi-stationary disturbances in the westerlies when forced over the continental land masses. Theoretical development, nomograms and tables given along with results of six one-day forecasts compared with actual analyses. Errors due to faulty analysis as well as faulty application of theory, discussed. Possibility of using this technique in long range forecasting of zonal index and hence, of changes in world weather. *Subject Headings:* **Mathematical forecasting, Zonal index, Stationary perturbations.**

2–49 551.509.317:551.501.7

Hovmöller, Ernest, **The trough-and-ridge diagram.** Tellus, 1(2):62–66, May **1949.** 2 figs., 4 refs. Abstract p. 62. **DWB**—A discussion is given concerning the construction and interpretation of a diagram which shows longitude and intensity of troughs and ridges at the 500 mb. level in middle latitudes as a function of time. *Subject Headings:* **Upper air analysis, Upper air charts, Presentation of data.**

2–50 551.509.317

Kruhl, Heinrich, **Beitrag zur synoptisch-aerologischen Auswertung der Topographie der 500 mb.—Fläche für die Wetterprognose.** [Contribution to synoptic-aerological evaluation

of the topography of the 500 mb. isobars for weather forecasting.] Annalen der Meteorologie, 2(1–2):1–17, Jan.–Feb. **1949.** 20 synoptic figs., table, 7 refs. Summary in German and English p. 1. **DWB**—The advance of tropospheric warm air with increase of surface pressure, and the invasion of cold air with decrease of pressure, are important for the general weather situation, forming warm anticyclones (upper highs and islands of warm air), and cold depressions (central depressions, cold pools). They contrast with the warm depressions and cold anticyclones of the frontal wave zone. The pressure and temperature fields leading to cold depressions and warm anticyclones are examined on a number of occasions and Scherhag's rules of divergence and convergence are re-defined to avoid numerous exceptions. *Subject Heading:* **Weather forecasting.**—*C.E.P.B.*

2–51 551.509.317:551.513:551.547

Namias, Jerome, **Evolution of monthly mean circulation and weather patterns.** American Geophysical Union, Transactions, 29(6):777–788, Dec. **1948.** 11 figs., 11 refs. Abstract p. 777. **DWB**—As a result of six years experiment in preparation of monthly mean forecasts from charts of air flow in the mid troposphere, the author concludes that the monthly temperature and precipitation anomalies over wide areas are determined by variations in monthly mean pressure (and hence air flow), and that these flow patterns undergo a gradual and orderly development. A large number of actual mean pressure and anomaly charts of temperature and precipitation are presented, along with schematic diagrams, to support the author's contention that these anomalies are based on well-known physical or dynamic processes. *Subject Headings:* **Long range forecasting, Atmospheric circulation, Upper air charts.**

2–52 551.509.318

Siegenthaler, Jakob, **Zur Erforschung von Grosswetterlagen-Übergängen.** [On the investigation of changes in the general weather situation.] Meteorologische Rundschau, 2(3–4):76–77, March–April **1949.** 4 refs. Summary in German p. 76. **MH-BH**—The author describes briefly a numerical method, based on pressure gradients and their changes over a large part of the northern hemisphere, for forecasting changes in the general weather type (Grosswetter) in Europe. *Subject Heading:* **Mathematical forecasting.**—*C.E.P.B.*

2–53 551.509.33

Husslein, Walter, **Gibt es eine barische Vorbereitung mitteleuropäischer Winter?** [Is there a barometric predisposition for central European Winters?] Annalen der Meteorologie, 2(1–2):36–44, Jan.–Feb. **1949.** 14 figs., 4 tables, 5 refs. Summary in German and English p. 36. **DWB**—The author gives average maps of pressure differences (November–October) and (December–November) preceding mild, normal and cold winters, and also maps for exceptional cases. Exceptions are so frequent that forecasting cold winters by change of monthly pressure is not possible, and forecasts of mild winters would be doubtful. Mild winters were more frequent 1881–1943 than 1761–1880. *Subject Heading:* **Long range forecasting.**—*C.E.P.B.*

2–54 551.509.33

†Pagava, S. T., **Osnovy sinopticheskogo metoda dolgosrochnykh prognozov pogody maloi zablagovremennosti.** [Basic synoptic method of long range weather forecasting for short periods.] Gidromet. Izdat. Moscow, **1946.** 76 p. 45 figs., (including synoptic charts), 19 tables, 58 refs. (SSSR, Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby, Nauchnois-sledovatelskikh Uchrezhdenii, Trudy, Ser. II [Sinopticheskaia Meteorologiia] No. 20.) **DWB**—In the first part of this monograph the author discusses the history of long range forecasting in the USSR as started in 1909 and continued under Multinovsky (1913–1941) and later by others at the Institute in Leningrad. He reviews the application of the concepts of "Natural Synoptic Periods," "Axes" and "Hearths" or Centers of Action along which air masses move or are transformed. Three pages are devoted to a report on methods used in the USA from 1908 to 1942 under the influence of Mitchell, Rossby, Namias, Holzman, Krick, Elliot and others, and of methods used in Germany by Baur (1929–date) and critiques of the American, German and Russian systems by Schell and others. Then he goes into greater detail, supported by schematic or actual synoptic and composite charts for Eurasia, concerning the application of the concept of Natural Synoptic Periods in analysis, forecasting and verification

of 4,000 forecasts, using 500 mb. topography and tendency charts. A chapter on verification of the short-period (5-day) forecasts based on this system compared with "control" forecasts based on climatology or "persistence," gives in tabular form the results, showing some degree of skill. The three page bibliography shows fairly complete knowledge of the domestic and foreign literature up to 1944; the latest publication referred to being a manuscript by I. A. Kibel on the application of his second approximation to forecasting, dated 1945. The author claims improvement over methods of Multanovsky, on whose work most of this report is based by the introduction of "Advective-Dynamic" or "Aerosynoptic" analysis concepts: in other words, by using charts of baric topography and isallohyps charts for natural synoptic periods. The work ends with the statement that it is necessary to improve the quality of the aerological observations before it will be possible to perfect a method of quantitative long range forecasting. *Subject Headings:* **Long range forecasting, Synoptic analysis, History, USSR, United States, Germany.**

2–55 551.509.532

Faust, Reinhard, **Ein Hilfsmittel zur Nachtfrostvorhersage.** [An aid to night frost forecasting.] Annalen der Meteorologie, 2(3–4):105–111, March–April **1949.** 4 figs., 3 tables, 4 refs., equations. Summary in German and English p. 105. **DWB**—Night frost is defined as grass minimum below 0°C. Using 14 h. data at Iserlohn, frost occurred on clear calm nights when frost index $F = T + e$ was below 20 (T, screen temperature in °C., e, vapor pressure in mm.). At Munster $F = 21.5$. For screen frost F' is about 14. Other rules for forecasting frost are compared, especially use of dew point instead of vapor pressure. *Subject Heading:* **Frost forecasting.**—*C.E.P.B.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

UPPER ATMOSPHERE—IONOSPHERE

2–56 551.510.41

Shaw, J. H., Sutherland, G. B. B. M., and Wormell, T. W., **Nitrous oxide in the earth's atmosphere.** Physical Review, Second Series, 74(8):978–979, Oct. 15, **1948.** 2 figs., 4 refs. **DWB**—Results confirm Adel's identification of nitrous oxide in the atmosphere, and show that the amount present is of the same order both in England and America. Phenomenon is thus worldwide and not local. Vertical distribution should be determined. *Subject Heading:* **Atmospheric composition.**

2–57 551.510.41

Effenberger, Ernst, **Kritische und vergleichende Untersuchungen der luftchemischen Messmethoden des Ozongehaltes und Gesamtoxydationswertes.** [Critical and comparative research on the air chemistry method of measuring ozone content and total oxidation values.] Meteorologische Rundschau, 1(15–16):488–491, Sept.–Oct. **1948.** 5 refs. Summary. **DWB**—The author maintains that the chemical analyses of air to determine its ozone content are erroneous when the methods of Regener and Cauer are employed, since other substances are measured along with the ozone. The error in some cases amounts to as much as 31%. *Subject Headings:* **Atmospheric composition, Methods of observation, Ozone.**

2–58 551.510.41:551.515

Effenberger, Ernst, **Messungen des Ozongehaltes und Gesamtoxydationswertes der bodennahen Luftschicht auf Sylt.** [Measurements of ozone content and total value of oxidation in the air layer near the ground at Sylt.] Meteorologische Rundschau, 2(3–4):94–97, March–April **1949.** 4 figs., 7 refs. Summary in German p. 94. **MH-BH**—The diurnal variation of ozone shows a day maximum and night minimum, superposed on irregular variations. Observations in May to August 1947 showed increased ozone during the passage of cold fronts, winds off the sea and especially during thunderstorms; and minima during and before the passage of warm fronts, at the monsoon inbreak, during winds off the land and generally in high pressure areas. The author does not accept ultraviolet radiation as the cause of variations of ozone. *Subject Headings:* **Ozone, Atmospheric disturbances.**—*C.E.P.B.*

2–59 551.510.42

Desmond, E., and Radok, U., **On the genesis of a dust wall.** Weather, 4(1):16–20, Jan. 1949. 3 figs., 3 refs. **DWB**—Analysis of storm of Dec. 30, 1947 in Victoria, Australia, by means of soundings and automatic records. *Subject Headings:* **Dust storms, Atmospheric pollution.**

2–60 551.510.5:551.510.53

Brewer, A. W., **Evidence for a world circulation provided by the measurements of helium and water vapour distribution in the stratosphere.** Royal Meteorological Society, Quarterly Journal, 75(326):351–363, Oct. 1949. 5 figs., 16 refs., 13 equations. Summary p. 351. **DWB**—Helium content of air is almost constant up to 20 km. At 1+km. above the tropopause in temperate regions air is very dry (R.H.ca.3%, frost point ca. 195°A. equal to equatorial stratosphere temperature). These facts are explained by a slow circulation without turbulence in the stratosphere (except just above tropopause). From distribution of ozone, author concludes that this circulation is upwards through tropopause near equator with a slow descent (ca. 50m./day) in higher latitudes. This subsidence calls for radiative cooling by ca. 0.5°C./day. *Subject Headings:* **Atmospheric structure, Stratosphere.**

2–61 551.510.5

Kraus, E., **The formation of a laminated tropopause and the mass exchange between the stratosphere and the troposphere.** Meteorological Magazine, [London], 78(929):322–330, Nov. 1949. 7 figs., 6 photos., table. **DWB**—On November 9, 1944, tropospheric tropical air was observed 12,000 feet above a tropopause in polar air at 410 mb. The trajectories of the air masses were plotted at 500, 400, and 300 mb. and showed strong convergence in the polar air, as a result of which vertical divergence dissipated the lower (polar) tropopause and drew stratospheric air into the tropopause. Such outbreaks of cold air with rapid anticyclonic development and tropical air above are frequent. *Subject Heading:* **Atmospheric structure, Tropopause.**

2–62 551.510.534

Dütsch, Hans-Ulrich, **Photochemische Theorie des Atmosphärischen Ozons unter Berücksichtigung von Nichtgleichgewicht-Zustanden und Luftbewegungen.** [Photochemical theory of atmospheric ozone in consideration of the state of non-equilibrium and air movements.] Leeman & Co., Zürich, 1946. 113 p. 8 figs., 36 tables, refs. Summary in German. **MH-BH**—*Subject Heading:* **Ozone.**

2–63 551.510.534

Stair, Ralph, **Winter measurements of ozone over the Organ Mountains, New Mexico.** National Bureau of Standards, Journal of Research, 42(2):145–152, Feb. 1949. 8 figs., table, 22 refs. Research Paper RP1958. **DWB**—Data on total amount of ozone measured from Dec. 16 to 19, 1947 and Jan. 6 to 8, 1948 at White Sands: equivalent to a layer .19 cm. thick at normal temperature and pressure. Details of method employed in calculation of ozone, and actual results shown graphically. Continuation of work cited in BAMS Bibliography No. 47–14, Nov. 1948. *Subject Heading:* **Ozone layer.**

2–64 551.510.534

Total stratosphere ozone. National Bureau of Standards, Technical News Bulletin, 32(2):16, Feb. 1948. fig. **DBS**—Device developed for determining total ozone content of atmosphere in connection with possible effects of ozone on current or future weather. Used at White Sands, New Mexico. Consists of phototube mounting, titanium phototube, and ultraviolet meter. *Subject Headings:* **Ozone layer, Instruments.**

2–65 551.510.534

Vassy, M. et Vassy, Mme. Étienne, **Variation diurne de la temperature moyenne de l'ozone atmospherique.** [Diurnal variation of the mean temperature of atmospheric ozone.] Académie des Sciences, Paris, Comptes Rendus, 228(9):764–765, Feb. 28, 1949. **DWB**—*Subject Heading:* **Ozone.**

2–66 551.510.535

McLeish, C. W., **Solar eclipse observations of the ionosphere.** Canadian Journal of Research, 26, Sec. A., (3):137–144, May 1948. 6 figs., 4 refs. DWB—Results of ionosphere measurements made in the region of totality during the eclipse of July 9, 1945. Analysis of results shows effective recombination coefficients of 1.6×10^{-8} for the E region, 1.4×10^{-9} for the F2 region. Evidence of a variable coefficient for E region agrees with the suggestion of Massey and others of a high negative ion density at this level. Site was at Victoria Beach, Manitoba, on the shores of Lake Winnipeg. *Subject Heading:* **Ionosphere.** *Author's abstract.*

MECHANICS AND THERMODYNAMICS

2–67 551.511:551.543

Austin, James M., **Temperature advection and pressure changes.** Journal of Meteorology, 6(5):358–360, Oct. 1949. 4 tables, 2 refs., equations. DWB—A brief discussion of data taken from four series of weather maps (during Oct.–Dec. 1946 and June 1948), showing that 3-hr. isallobaric centers occur in regions of strong advection of warm and cold air in the lower troposphere. High correlations indicate verification of Kibel's first approximation formula, according to the author. *Subject Headings:* **Pressure variations, Thermodynamics of the atmosphere.**

2–68 551.511:551.542.1:551.552

Crossley, A. F., **On the relation between wind and pressure.** Royal Meteorological Society, Quarterly Journal, 74(321–322):379–382, July–Oct. 1948. ref., 13 equations. DWB—Further theoretical consideration of the work of Grimes as discussed by the author in a previous article, with respect to solution of equations of motion for determining wind from pressure gradients under conditions of steady frictionless flow. In the tropics when the pressure gradient ceases, the wind does not always die out and low level winds show little relation to the isobars and once a strong cold outburst attains a component across the isobars on a large scale, it can continue even across the equator without corresponding to the pressure field until it again reaches high latitudes. *Subject Headings:* **Mechanics of the atmosphere, Gradient winds, Tropics.**

2–69 551.511

Forsythe, George E., **Exact particle trajectories for non-viscous flow in a plane with constant Coriolis parameter.** Journal of Meteorology, 6(5):337–346, Oct. 1949. 3 figs., 15 refs., 33 equations. Abstract p. 337. DWB—A detailed theoretical treatment of the trajectories which air particles will follow in a simple pressure and density field, similar to the work done by Hesselberg (1915) and others. The theory is extended to the calculation of the exact trajectory of an air particle in a high pressure center with maximum horizontal pressure gradient for that case. Also the case of stationary circular isobars is discussed and illustrated. *Subject Headings:* **Mechanics of the atmosphere, Particle trajectories, Geostrophic winds.**

2–70 551.511

Hölder, Ernst, **Die Differentialgleichung für die Stromfunktion der stationären rotationssymetrischen Zirkulation einer adiabatisch veränderlichen reibungsfreien Atmosphäre über der Erde.** [The differential equations for the stream functions of stationary, symmetrically rotating circulation of an adiabatically variable frictionless atmosphere over the earth.] Meteorologische Rundschau, 1(15–16):449–450, Sept.–Oct. 1948. equations. DWB—A condensed, but completely theoretical, treatment based on the equations of Helmholtz, Exner, Margules and Bjerknes, and extended to cover the special case indicated by the title. *Subject Headings:* **Mechanics of the atmosphere, Stream functions.**

2–71 551.511:551.557

Sawyer, J. S., **The significance of dynamic instability in atmospheric motions.** Royal Meteorological Society, Quarterly Journal, 75(326):364–374, Oct. 1949. table, 41 refs., 11 equations. Summary p. 364. DWB—The author summarizes recent work on Solberg's criterion of dynamic instability, that anticyclonic wind shear along an isentropic surface exceeds the Coriolis parameter. As a basis he adopts a criterion due to Van Mieghem (1947,

1948) involving curvature of isobars. He concludes that dynamic instability is not likely to exceed critical value over distances great enough to initiate large extra-tropical depressions (some observed values are given). Turbulence resulting from dynamic instability limits anticyclonic shear south of the jet stream and therefore limits intensity of sub-tropical circulation; it may cause tropical cyclones. *Subject Headings:* **Dynamics of the atmosphere, Instability.**

2–72 551.511:551.542.1:551.552

Sellick, N. P., **Horizontal wind fields and pressure gradient.** Royal Meteorological Society, Quarterly Journal, 74(321–322):266–276, July–Oct. **1948.** 3 figs., 6 refs., 17 equations. Summary p. 266. **DWB**—Development of theoretical models of various linear flow patterns (after Shaw) and extension to cover cases of non-geostrophic flow, cols, elliptical fields, waves of translation and fields of limited extent. *Subject Headings:* **Mechanics of the atmosphere, Stream functions.**

2–73 551.511

Zwart, Jacob, **Über die Beziehungen zwischen den Advektionstheorien.** [On the relation between advection theories.] Meteorologische Rundschau, 2(1–2):1–5, Jan.–Feb. **1949.** 9 refs., 41 equations. Summary in German and English p. 1. **MH-BH**—The author investigates the hypothesis that all advection formulas based on special assumptions are special cases of H. Ertel's formula based on very general assumptions (Methods and Problems of Dynamic Meteorology, Berlin, 1938). He finds that the Rossby advection equations (**Beiträge zur Physik der freien Atmosphäre,** 13(3):163–174, 1927), and the Arnason advection formula (**Meteorologiske Annaler,** 1(10):255–279, 1942) can be transformed to the Ertel equation, but not the Ertel-Li and Blüthgen formulas, which are of a special nature. Some errors and obscurities in the existing advection theory are corrected. *Subject Headings:* **Advection theory, Mechanics of the atmosphere.**—*C.E.P.B.*

GENERAL CIRCULATION

2–74 551.513

†Berggren, R., Bolin, B., and Rossby, Carl-Gustav (Stockholm), **An aerological study of zonal motion, its perturbations and breakdown.** Tellus, 1(2):14–37, May **1949.** 26 figs., 2 tables, 22 refs., equations. Abstract p. 14. In English. **DWB**—A well illustrated analysis of a case of blocking action in advance of a series of rapidly-moving frontal waves over Central Europe continuing the work of Namias and Elliot on Blocking Action over America and the Atlantic. The authors systematically discuss and illustrate the features of the 500 mb. pattern for a week after the blocking begins. Cross sections made from aerological ascents over Europe show the potential temperature, the wind speed and frontal surfaces and position of jet stream at critical times in this period. Speed of movement of troughs and fronts, and speed of retrogression of contour lines from Europe back to the Western Atlantic give numerical values to aid the analyst and to supplement the theoretical discussion. *Subject Headings:* **Atmospheric circulation, Waves in the westerlies, Blocking action.**

2–75 551.513:551.543

Hofmann, Alfred, **Die Darstellung von Zirkulations-Anomalien durch die Jahresperiode des Luftdrucks.** [Representation of circulation anomalies by means of the annual variation of air pressure.] Meteorologische Rundschau, 1(11–12):330–332, May–June **1948.** 6 figs., 4 refs. **DWB**—Periodic analysis of pressure wave patterns over the North Atlantic and Europe, showing "nodes" (where the phase changes), and differences between amplitude and phase of waves in years with "planetary" and years with "monsoonal" circulation over central Europe. *Subject Headings:* **Atmospheric circulation, Pressure anomalies.**

2–76 551.513.1

Kuo, Hsiao-lan, **Note on the inertial stability of geostrophic zonal flow.** Journal of Meteorology, 6(5):356–358, Oct. **1949.** 6 refs., 9 equations. **DWB**—*Subject Headings:* **Atmospheric circulation, Mechanics of the atmosphere.**

2–77 551.513(99)

Mirrlees, S. T. A., **Notes on Southern Hemisphere circulation.** Meteorological Magazine, [London], 78(929):315–321, Nov. 1949. 4 figs., 5 tables, 5 refs. **DWB**—Brief analysis of records for 1934–37 in the region between 40° and 70°S. in the longitude of Cape Horn and Graham Land. An attempt is made to show how pressure variations affect the circulation under normal and abnormal conditions. *Subject Headings:* **Atmospheric circulation, Pressure variations, Antarctic.**

2–78 551.513

Namias, Jerome and Clapp, Philip F., **Confluence theory of the high tropospheric jet stream.** Journal of Meteorology, 6(5):330–336, Oct. 1949. 9 figs., 9 refs. Abstract p. 330. **DWB**—An attempt to explain the "jet stream" by a theory that the energy is derived from a direct transformation of potential into kinetic energy and is independent of stability, and that the confluence or juxtaposition of cold and warm air currents creates the concentration of isotherms and the potential energy field which results. The work of Palmén and others is drawn upon to support this theory; cross sections and normal charts of the northern hemisphere circulation illustrate this brief but detailed article. *Subject Headings:* **Atmospheric circulation, Jet stream, Confluence.**

2–79 551.513.1

Sekera, Zdenek, **The distribution of kinetic energy in certain steady barotropic currents.** Journal of Meteorology, 6(5):321–329, Oct. 1949. 3 figs., 5 refs., 24 equations. Abstract p. 321. **DWB**—Theoretical treatment of two cases of dispersion of kinetic energy in a zonal current: one the deflection of a zonal current, and the second, the splitting of a jet stream. Stream lines are computed for each case. *Subject Headings:* **Atmospheric circulation, Jet stream.**

2–80 551.513:551.577:551.509(7)

Starrett, Loyd G., **The relation of precipitation patterns in North America to certain types of jet streams at the 300-millibar level.** Journal of Meteorology, 6(5):347–352, Oct. 1949. 15 figs., 5 refs. Abstract p. 347. **DWB**—The relation between high winds at the 300 mb. level and 24 hour precipitation amounts is studied for 57 cases in North America. Graphical evidence is shown for the contention that the maxima coincide fairly well, the areas of heaviest precipitation lying within 4° or 5° of the jet stream axis in 2 out of 3 cases, giving the forecaster a new tool. *Subject Headings:* **Jet stream, Precipitation distribution, Methods of forecasting, North America.**

2–81 551.513

Sutcliffe, R. C., **The general circulation of the atmosphere.** Royal Meteorological Society, Quarterly Journal, 75(326):417–434, Oct. 1949. 8 figs., 13 refs. Discussion p. 430–434, and Meteorological Magazine, [London], 75(926):228–230, Aug. 1949. **DWB**—Friction would destroy all momentum in the atmosphere in 5–6 days. Circulation in the troposphere is maintained by a non-adiabatic gain of heat in disturbed regions (particularly in middle and very low latitudes) and a loss in anticyclonic regions (sub-tropics and poles). The pattern is cellular defined by the synoptic circulation. Four types are illustrated by northern hemisphere surface and 500 mb. charts. Different types may persist over more than 5 days and therefore represent different ways of satisfying requirements of general circulation. Discussion: There are two dominant types of eddies, long and short wave length. Eddy flux of heat balances heat loss by radiation; there is also advective flux. Deep meridional currents can maintain zonal circulation against friction. The role of the stratosphere was also discussed. *Subject Heading:* **Atmospheric circulation.**

2–82 551.513.1

Widger, William K., Jr., **A study of the flow of angular momentum in the atmosphere.** Journal of Meteorology, 6(5):291–299, Oct. 1949. 3 figs., 3 tables, 14 refs., 18 equations. Abstract p. 291. **DWB**—The net total generation and poleward transport of angular momentum in the atmosphere between 10° and 80°N. latitude was studied and illustrated by

tables and diagrams, for the month of January 1946. This month was chosen as one with a fairly normal circulation pattern, and the quantitative study was intended to serve as a pilot project to test and confirm the theoretical calculations of Starr. *Subject Headings:* **Atmospheric circulation, Transport of momentum, Mechanics of the atmosphere.**

2–83 551.513.1

White, Robert M., **The role of mountains in the angular-momentum balance of the atmosphere.** Journal of Meteorology, 6(5):353–355, Oct. 1949. 2 figs., table, 5 refs. **DWB**—The effect of high mountain ranges is to add angular momentum to the atmosphere in low latitudes and to subtract momentum in high latitudes and even in low latitudes in spring. The order of magnitude of the effect is the same as the effect of surface friction. *Subject Headings:* **Atmospheric circulation, Transport of momentum, Mechanics of the atmosphere, Frictional effects.**

ATMOSPHERIC DISTURBANCES

2–84 551.515:551.509

Eady, E. T., **Long waves and cyclone waves.** Tellus, 1(3):33–52, Aug. 1949. 6 figs., table, numerous equations. Abstract p. 33. **DWB**—In this highly compressed and well illustrated theoretical paper, the author attempts to solve all of the differential equations for atmospheric motion, from the initial stage of steady baroclinic flow through the development and analysis of arbitrary disturbances, and finally to the stage of long wave modifications and wave cyclones. The initial systems are shown to be unstable while the mere stable wave cyclones tend to grow at a limited rate to a certain size and structure. The statistical probability of chance developments limiting the ultimate accuracy of forecasts, increases rapidly with time, according to inferences made in the last section of this article. *Subject Headings:* **Atmospheric motion, Weather forecasting.**

2–85 551.515:551.513

Palmén, E., **Origin and structure of high-level cyclones south of the maximum westerlies.** Tellus, 1(1):22–31, Feb. 1949. 13 figs., 8 refs., 2 equations. Abstract p. 22. **DWB**—Detailed analysis of aerological and synoptic conditions during the genesis and seclusion of a cold, high-level cyclone which formed on and developed to the south of the belt of maximum westerlies (over the Southwestern States on November 1–7, 1946). A similar case occurred a few days later over California (November 10–14, 1946) but this case is only briefly described and illustrated. This work is a good example of application to situations over North America of the Bjerknes and Palmén techniques of aerological-synoptic analysis which were carried out in great detail ten or fifteen years ago for certain notable situations over Europe and which set the standards used today in most daily weather-analysis centers. The present analysis is supported by a theoretical discussion, schematic diagrams, and cross sections using radiosonde data from a dense network of stations in the West and for levels up to 100 mb. One cannot but remark on the lowering of the tropopause from 300 to 400 mb. as the cold-vortex is cut off and intensifies over the Southwest. *Subject Headings:* **Cyclones, Atmospheric circulation.**

2–86 551.515:551.510.53

Platzman, George W., **The motion of barotropic disturbances in the upper troposphere.** Tellus, 1(3):53–64, Aug. 1949. 4 figs., 10 refs., 6 equations. Abstract p. 53. **DWB**—As implied in the title, this paper treats of the movement and frequency of long waves in the westerlies of the upper troposphere, based on the models of a barotropic atmosphere supplied some ten years ago by Rossby, Haurwitz and others, and modified in the light of recent theories of Rossby with respect to the intense westerly circulation. The differential equations for velocity distribution of the mean motion, the propagation of disturbances, and the energy propagation are given and discussed in detail. *Subject Headings:* **Waves in the westerlies, Upper troposphere.**

2–87 551.515.1

Bleck, Gerhard, **Ein Beitrag zur Trajektorientheorie.** [A contribution to the theory of trajectories.] Annalen der Meteorologie, 2(3–4):96–99, March–April 1949. 6 figs., 8 refs., 5 equations. Summary in German and English p. 96. **DWB**—Author describes a simplified

method of calculating by graphical vector addition the trajectories in: (1) A frictionless circular moving cyclone in which velocity V is given by $ar/(b+r^2)^2$, where r is distance from the centre. In the example, a = 250, b = 27, a whirl develops only near the centre and fronts are formed. (2) Introduction of friction destroys the central whirl. (3) A frictionless wave disturbance gives smooth trajectories. (4) A wave disturbance with friction gives a disturbed central area. Four calculated circulations are shown. *Subject Headings:* **Cyclones, Particle trajectories.** —*C.E.P.B.*

2–88 551.515.11:551.543

Lingelbach, Ernst, **Betrachtungen zur Kompensation.** [Considerations on "compensation."] Meteorologische Rundschau, 1(11–12):329–330, May–June **1948.** 2 figs., 9 refs. Summary in German and English p. 329. **DWB**—*Subject Headings:* **Pressure changes, Mechanics of the atmosphere, Cyclogenesis.**

2–89 551.515.2

†Riehl, Herbert, **On the formation of typhoons.** Journal of Meteorology, 5(6):247–264, Dec. **1948.** 28 figs., 21 refs. Abstract p. 247. **DWB**—An excellent presentation of carefully analyzed upper air wind and streamline data for the western Pacific Ocean, showing that (1) there is no well defined equatorial front extending across the Pacific, and (2) there is a system of large scale eddies at 200 mb. in the equatorial trough. Typhoons are formed as a result of instability in the trades which occurs when a lower trough is passed over by a ridge in the high troposphere. There is no evidence of southern hemisphere air intruding into the northwest Pacific at times of typhoon formation. Finally the author goes into the reason for some storms developing into full-scale hurricanes. *Subject Heading:* **Typhoons.**

2–90 551.515.3(43)

Hommel, Karlheinz, **Der Wirbelsturm am 29. Juli 1947 im Raum von Geisenheim bis Darmstadt.** [The cyclonic squall on July 29, 1947 in the area from Geisenheim to Darmstadt.] Meteorologische Rundschau, 1(15–16): 491–492, Sept.–Oct. **1948.** 2 figs. **DWB**—A detailed synoptic aerological survey of a remarkable line-squall which damaged vineyards, woodlands, orchards, and roofs along a path several miles wide just south of Mainz and Frankfurt in western Germany. Just prior to the storm which accompanied a cold front, temperatures were the highest ever recorded in that area; but during the storm they suddenly dropped 20° to 30° with winds over 80 miles per hour and heavy local hail. In spite of the heavy damage there was no mention of a tornado or funnel cloud. *Subject Headings:* **Tornadoes, Germany.**

2–91 551.515.4:551.582(73)

Visher, Stephen S., **Thunderstorms.** Scientific Monthly, 66(4): 335–340, April **1948.** 8 figs. **DLC**—Discussion of thunderstorm frequency and characteristics, especially in the USA, based on data in the U. S. Weather Bureau Hydrometeorological Report No. 5 "Thunderstorm Rainfall." *Subject Headings:* **Thunderstorms, Climatology, United States.**

2–92 551.515.4:551.582:551.577.38(43)

Zimmermann, Gerhard, **Zur Gewitterhäufigkeit in heissen, trockenen Sommern.** [On thunderstorm frequency in hot, dry summers.] Meteorologische Rundschau, 1(15–16):470–471, Sept.–Oct. **1948.** ref. **DWB**—The author tests the theory advanced by Scherhag that thunderstorm activity increases with increasing temperature. It is shown that for Bad Kissingen (1908–1946) hot summers are also wetter than normal and vice versa, and that hot and wet summers have above average thunderstorm activity more than five times as often as do cold, dry summers. However, the actual deviation from normal is not very pronounced. The summer of 1947 was the hottest and driest on record, and the number of thunderstorm days was just two below the normal of 22 days. *Subject Headings:* **Thunderstorms, Climatology, Bad Kissingen, Germany.**

2–93 551.515.427

Byers, Horace R., and Hull, Edwin C., **Inflow patterns of thunderstorms as shown by winds aloft.** American Meteorological Society, Bulletin, 30(3):90–96, March **1949.** 9 figs.,

9 refs. Abstract. Conclusions. **DWB**—A well illustrated article summarizing the data resulting from a systematic study of convergence and divergence in and around thunderstorms. Eight "swarm" ascents of balloons followed by radar were computed, showing that as a rule there is convergence beneath a cumulo-nimbus before rain begins falling, whereas after rain begins there is horizontal divergence at the surface, convergence from 4,000 to 15,000 feet, rapid convergence reaching a maximum from 15,000 to 20,000 feet or more, and finally divergence in the highest levels of the system. The accelerated updraft in a thunderstorm cloud more than makes up for the down drafts extending from the base to the surface of the earth, so that the net effect at all levels below the cloud top is convergent (inflow or entrainment). The wind field is so disrupted by up and down drafts near a thunderstorm that wind aloft measurements are worthless as indicators of the general wind field. *Subject Headings:* **Thunderstorms, Upper air winds.**

2–94 551.515.7

Flohn, Hermann, **Über kalte metastabile Hochdruckgebiete (Statistisch-synoptische Untersuchungen I.).** [On cold metastable anticyclones (Synoptic statistical investigations I.).] Meteorologische Rundschau, 2(3–4):67–75, March–April **1949.** 9 figs., 3 tables, 43 refs. Summary in German p. 67. **MH-BH**—Eighteen cases of nearly stationary high pressure areas of cold tropospheric air are investigated. Only pure warm or cold anticyclones can be stationary, not those of mixed thermal constitution. Steering and frontogenesis are set out diagrammatically and the theories of Exner and Koschmieder amplified. The frequent cold anticyclones in Canada, Russia, Siberia and the Antarctic are investigated by means of upper air data. *Subject Heading:* **Anticyclones.**—*C.E.P.B.*

2–95 551.515.7:551.513.7

Becker, Richard, **Der planetarische Jahresgang der maritim-subtropischen Hochdruckkerne.** [The planetary annual variation of the maritime-subtropical anticyclones.] Annalen der Meteorologie, 2(1–2):48–51, Jan.–Feb. **1949.** fig., 8 refs. Summary in German and English p. 48. **DWB**—Over the continents in each hemisphere, pressure is high in winter and low in summer. The subtropical anticyclones over the oceans on the other hand reach their greatest development in June or July in both hemispheres. The explanation given is that the evacuation of air from the great northern continents in summer, due to the great annual range of temperature, raises the pressure over all the rest of the world, but earlier in the northern oceans (June) than in the southern (July). *Subject Headings:* **Anticyclones, Dynamics of the atmosphere.**—*C.E.P.B.*

2–96 551.515.8:551.582(624)

El-Fandy, M. G., **Forecasting the summer weather of the Sudan and the rains that lead to the Nile floods.** Royal Meteorological Society, Quarterly Journal, 75(326):375–398, Oct. **1949.** 21 figs., 4 tables, 6 refs. Summary p. 375. **DWB**—Summer pressure over Sudan shows a minimum in N. E. and a maximum in S. E., both fluctuating from day to day. Four types of disturbance are described: (1) Haboobs with strong S—SW monsoon winds and northward movement of pressure maximum and Intertropical Convergence Zone (**ICZ**). (2) Haboobs with induced cold fronts set up by thunderstorms. (3) Local instability thunderstorms when **ICZ** is furthest north. (4) High-level thunderstorms with widespread rain due to moist cold E—SE winds above 750 mb. level. Each type is illustrated by upper air curves and synoptic charts. *Subject Headings:* **Synoptic climatology, Atmospheric disturbances, Weather forecasting, Thunderstorms, Sudan.**

2–97 551.515.8

Faust, Heinrich, **Spiraliger Verlauf einer Okklusion.** [The spiral course of an occlusion.] Meteorologische Rundschau, 1(11–12): 342–344, May–June **1948.** 3 figs., 3 refs. **DWB**—The author describes, and gives three synoptic charts, to show the development of a spiral (and retrograde) occlusion over the Ukraine (May 21–23, 1943). *Subject Headings:* **Synoptic meteorology, Occlusions.**

2–98 551.515.8:551.557

Miles, M. K., **Air motion ahead of warm fronts.** Royal Meteorological Society, Quarterly Journal, 75(326):399–410, Oct. **1949.** 5 figs., 8 tables, 9 refs., 9 equations. Summary p. 399. **DWB**—The ageostrophic wind was found for 60 occasions of warm front over England. These are classified according to angle between geostrophic and ageostrophic vectors and by magnitude $|A|$ of the latter. $|A|$ is related to vector change J' of geostrophic wind along trajectory in previous 6 hours by $|A| = 0.78J' - 1.0$, correlation 0.88. Motion of cold air ahead of a warm front is considered to be due to a superimposed pressure gradient increasing exponentially; this agrees with observation. *Subject Heading:* **Structure of disturbances.**

RADIATION AND TEMPERATURE

RADIATION

2–99 551.521.12(43)

Berg, Hellmut, **Die Globalstrahlung in Westdeutschland.** [Global radiation in West Germany.] Annalen der Meteorologie, 2(1–2):30–35, Jan.–Feb. **1949.** 5 figs., 5 tables, 4 refs. Summary in German and English, p. 30. **DWB**—Average values and frequencies of 6 years of total radiation from sun and sky and duration of sunshine are given for Hoefchen (51.1°N., 7.1°E.). Ångström's relation between radiation I and sunshine duration R (as fraction of possible), $I = I_0[a + (1-a)R]$ is found to hold here, a averaging 0.25 but irregular. This relation does not hold at Bochum or Davos. *Subject Headings:* **Radiation, Germany.**—*C.E.P.B.*

2–100 551.521

Reuter, H., **Zur Theorie des Wärmehaushaltes strahlungsdurchlässiger Medien.** [On the theory of the heat economy of media pervious to radiation.] Tellus, 1(3):6–14, Aug. **1949.** 4 figs., table, 12 refs., 19 equations. Abstract in English p. 6. **DWB**—The properties of snow, ice, water and earth are studied with respect to the effect of incoming and outgoing radiation; and a theory is advanced, which is an extension of the theory developed by the author in a previous article with regard to snow surfaces, to take in the case of the heat economy of ice. It is suggested that the case of calm, pure water would follow the same form as that for ice, since the same coefficients of absorption apply to water and ice. *Subject Heading:* **Radiation.**

2–101 551.521.1(43)

*Sydow, Erich, **Die Globalstrahlung in Oberstdorf und auf dem Nebelhorn.** [Global radiation in Oberstdorf and on the Nebelhorn.] Meteorologische Rundschau, 1(11–12):336–339, May–June **1948.** fig., 2 tables, 4 refs. Summary in German and English p. 336. **DWB**—Data on total incoming radiation obtained at the two stations mentioned in (2–102) are analyzed to show variations with time of day and year, on clear and cloudy days, and between mountains and valleys. Five-day means are computed for the entire year to show how air-mass movements affect the radiation climate of the northern slope of the Alps. *Subject Headings:* **Solar radiation, Sunshine, Mountain meteorology, Germany.**

2–102 551.521.63:551.508.21

Sydow, Erich, **Untersuchungen der Ultraviolettstrahlung mit dem UV-Dosimeter der I. G. Farben.** [Research on ultraviolet radiation with the I. G. Farben UV-dosimeter.] Meteorologische Rundschau, 1(11–12):333–336, May–June **1948.** 5 figs., ref. **DWB**—The author describes the equipment and the conditions under which the observations were made with the I. G. Farben ultraviolet-dosimeter. Scatter diagrams show correlation and variance of UV intensity for 10° to 64° solar height using 400 observations at Oberstdorf (elevation 2,000 ft.), and 60 observations made under similar conditions on the Nebelhorn (6,500 ft.) in 1942 and 1943. From these data generalized curves are drawn, which approximate those made from data obtained at two other stations farther north, but at lower elevations, respectively. *Subject Headings:* **Ultraviolet radiation, Dosimeters.**

2–103 551.521.1

Vassy, Mme. Étienne, **L'effet de la température sur les bandes de Chappuis de l'ozone, aspect géophysique.** [The effect of temperature on the Chappuis ozone bands in its geophysical aspect.] Journal Scientifique de la Météorologie, 1(1):14–17, Jan.–March **1949.** 8 refs. Summary in French, English and Spanish p. 14. **MH-BH**—A table is given, showing the results of calculations made by Mme. Vassy, of the coefficients of absorption for temperatures of −42°, −80° and −105°C., as well as for +18°C. for wave lengths from 4,500 to 6,010A°. The variation is 20% for the maxima at 6,010 and 5,750A° between the highest and lowest temperatures. *Subject Heading:* **Solar radiation.**

TEMPERATURE

2–104 551.524(4)

Hofmann, Alfred and Geiss, Adam, **Die Erhaltungsneigung positiver Temperatur-Anomalien im Hochwinter Mitteleuropas.** [The persistence tendency of positive temperature anomalies in mid-winter in central Europe.] Meteorologische Rundschau, 2(1–2):31–32, Jan.–Feb. **1949.** fig., 4 tables, 4 refs. **MH-BH**—Twenty very cold Januaries were followed by 13 cold and seven warm Februaries; nine very mild Januaries were followed by one cold and eight warm Februaries. Mild Januaries show an accentuation of the planetary circulation and this is more stable than the "monsoon" circulation of cold Januaries; it may possibly be of use in forecasting. *Subject Headings:* **Temperature anomalies, Europe.**—*C.E.P.B.*

2–105 551.524.2(43)

Holzapfel, Rupert, **Über die Temperatur im deutschen Mittelgebirge.** [On the temperature in the German Mittelgebirgen.] Meteorologische Rundschau, 2(1–2):33–34, Jan.–Feb. **1949.** fig., 3 tables, 4 refs. **MH-BH**—The author gives monthly mean temperatures for 14 stations between 289 and 1,051 m., and compares values for stations near 1,000 m. with temperatures in the free air at that height. *Subject Headings:* **Temperature distribution, Germany.**—*C.E.P.B.*

2–106 551.524:551.582(43)

Schirmer, Hans, **Die absoluten Extremtemperaturen des niedersächsichen Flachlandes.** [The absolute extreme temperature of the Lower Saxony plains.] Meteorologische Rundschau, 1(17–18):531–535, Nov.–Dec. **1948.** 7 figs., refs. Summary p. 531. **DWB**—For the period 1881–1930, data on extreme maximum, minimum and range of temperature are given for 27 stations in Lower Saxony. Isoline charts show detail variation and location of stations. *Subject Headings:* **Temperature extremes, Climatology, Germany.**

2–107 551.524(4)

Schneider-Carius, Karl, and Huttary, Josef, **Der Jahresgang der Temperatur über Europa in der "Normalperiode."** [The annual variation of temperature over Europe in the "normal period."] Meteorologische Rundschau, 2(3–4):77–83, March–April **1949.** 12 figs., table, 10 refs. Summary in German p. 77. **MH-BH**—"Relative temperature" is the monthly mean temperature as a percentage of the annual range (coldest month 0, warmest 100). The author calls means of relative temperature of a large number of stations in west and central Europe the "neutral value" and gives maps of (relative−neutral) temperature for March to December and some differences (1901–30)—(1851–1930). *Subject Headings:* **Temperature variations, Europe.**—*C.E.P.B.*

2–108 551.524.32

Johannsen, Hans Hinnerk, **Reduktion langjähriger Tagesmittel der Lufttemperatur.** [Reduction of long daily mean air temperature records.] Meteorologische Rundschau, 1(15–16):473–474, Sept.–Oct. **1948.** fig., 4 tables, 2 refs. **DWB**—Mean and extreme errors introduced into average monthly temperatures when corrected values for one station are substituted for values from another at a distance of 130 to 210 km. Records for Frankfurt-Bayreuth, Stuttgart-Augsburg, and inter-combinations of those stations with 80 year records show that the mean error ranges from 0.12° to 0.36°C. and extreme errors from 0.2° to 0.7°C., although the actual temperature difference may be considerable for any given month, and

especially for any given day. Thus, daily mean values for one station may be compiled from long records not only at nearby, but at distant stations in the same general climatic zone. *Subject Headings:* **Temperature normals, Statistics in climatology.**

2–109 551.524.34(437)

Portig, W., **Säkulare Klimaschwankungen.** [Secular variations of climate.] Annalen der Meteorologie, 2(1–2):58–59, Jan.–Feb. **1949. DWB**—With Prague as a centre the distribution of various indices of temperature in different directions was found. Values of the same indices at Prague were also found for each decade. In this way the direction of the shift of the climatic region for each decade was calculated. The directions changed gradually from 162° (SSE) in 1790 to −14° (NNW) in 1920; the author infers that there is a climatic cycle of 260–270 years. *Subject Headings:* **Temperature variations, Climatic variations, Prague.** —*C.E.P.B.*

2–110 551.524.34

Schindler, Gerhard, **Neue statistische Untersuchungen an der Prager Temperaturreihe 1775–1943.** [New statistical investigations of the Prague temperature series 1775–1943.] Meteorologische Rundschau, 2(1–2):15–20, Jan.–Feb. **1949.** 2 tables, 30 refs. Summary in German p. 15. **MH-BH**—The author gives frequencies and range of positive and negative anomalies of temperature (+ more frequent than −) in each month. Comparison of the anomaly of each month with the following shows agreement in 54–68 per cent. The sequence of abnormal winters and the following summers is examined, and some persistence of very extreme seasons is found. The relation of abnormal months to the sunspot cycle is discussed. *Subject Heading:* **Temperature anomalies.**—*C.E.P.B.*

2–111 551.524.36

Troeger, Heinz, **Die Abschätzung der Tageshöchst-und-tiefsttemperatur.** [The estimate of the highest and lowest daily temperature.] Meteorologische Rundschau, 1(15–16):474–475, Sept.–Oct. **1948.** table. **DWB**—*Subject Heading:* **Temperature forecasts.**

2–112 551.524.36:523.74

Visser, S. W., **Heat waves of the year 1947 and solar activity.** Royal Meteorological Society, Quarterly Journal, 75(326):411–416, Oct. **1949.** 2 figs., 2 tables, 6 refs. Summary p. 411. **DWB**—Daily sunspot numbers April–Oct. 1947 showed a series of strong waves, maxima at 27-day intervals, time between maxima and minima decreasing. Maximum temperatures at De Bilt (Holland), reversed, followed this oscillation closely, giving a negative correlation with a lag of 21 days. Storms in F_2 layer show a similar correlation, lag 18 days. *Subject Headings:* **Cosmic influences, Sunspot waves, Heat waves.**

2–113 551.524.37

Dimitz, L., **Untersuchungen über die Frostdauer in 2 m. und 5 cm. über dem Erdboden.** [Investigations of the duration of frost at 2 m. and 5 cm. above the ground.] Wetter und Leben, 2(3–4):58–61, July **1949.** 4 tables, 3 refs. **MH-BH**—In Austria the frost-free period at 2 m. (screen frost) averages 24 days longer than at 5 cm. (ground frost). The figures are very variable from year to year (Vienna 6 to 85 days) and place to place (3 to 45 days) depending on the relative frequency of radiation and advection frosts. *Subject Headings:* **Frosts, Microclimatology.**—*C.E.P.B.*

2–114 551.524.7:551.507.18:551.547

Penndorf, Rudolf, **Die vertikale Druck- und Temperaturverteilung bis 120 km. Höhe über Neu Mexiko (USA).** [The vertical pressure and temperature distribution up to 120 km. height over New Mexico (USA).] Annalen der Meteorologie, 2(3–4):91–95, March–April **1949.** 3 figs., 8 refs., 2 equations. Summary in German and English p. 91. **DWB**—V-2 ascents at White Sands carried radio instruments to 120 km. Pressure was measured by aneroid to 10 mb., and vacuum meters to 10^{-6} mb. Temperature was measured by dp/dh. Temperature gave minima of ca. 210°K. at 20 km. and 180–220°K. about 80 km., and a maximum of 275–320°K. at 50–60 km. The absolute values above 100 km. are uncertain but in

E-layer (110–120 km.) may reach 300°K. *Subject Headings:* **Upper air temperature, Upper air pressure, Rockets.**—*C.E.P.B.*

2–115 551.526.6:551.524.31(484.9)

Wahl, Eberhard, **Temperaturmessungen in der Nordsee im Sommer 1948.** [Temperature measurements in the North Sea in the summer of 1948.] Annalen der Meteorologie, 2(3–4):65–71, March–April **1949.** 5 figs., 3 refs. Summary in German and English p. 65. **DWB**—On a lightship in 54°N., 3°32′E. air and sea temperatures were observed hourly from June 17 to July 10. Daily ranges were: air 0.72°C. (smoothed, 0.56), sea 0.27 (0.24). Air averaged 0.74°C. colder than sea. State of tide had no appreciable effect. Some anomalous temperature changes are briefly discussed. *Subject Headings:* **Air-sea temperature variations, North Sea.** —*C.E.P.B.*

ATMOSPHERIC PRESSURE AND WIND

PRESSURE

2–116 551.543

Bryson, Reid A., **On a lunar bi-fortnightly tide in the atmosphere.** American Geophysical Union, Transactions, 29(4):473–475, Aug. **1948.** 2 figs., 2 tables, ref. Abstract p. 473. **DWB**—Using 20 years of data (from the U. S. Weather Bureau, Northern Hemisphere Sea Level Charts) the author attempts to show that there is a significant bi-fortnightly lunar tide in the atmosphere, although he admits that several thousand years of observational data would be necessary to eliminate non-periodic variations and other influences as Chapman did with respect to semi-diurnal lunar atmospheric tides. The tests are shown in tabular and graphical form, and although the amplitude of the cycle is small, the significance level is given as one in a thousand. *Subject Heading:* **Atmospheric tides.**

2–117 551.543

Douglas C. K. M., **Pressure irregularities on August 23–24, 1944.** Meteorological Magazine, [London], 78(929):309–314, Nov. **1949.** 6 figs., table. **DWB**—Analysis of a peculiar synoptic situation which resulted in sudden changes of wind, pressure, cloudiness, equivalent potential temperature and winds aloft over the British Isles. Automatic records for these elements and current synoptic charts are reproduced in detail. *Subject Heading:* **Pressure changes.**

2–118 551.543.3(489.9)

Walden, Hans, **25-tägiger Zyklus tiefen Luftdrucks im südlichen Nordmeer November 1947 bis Dezember 1948.** [A 25-day periodicity of low pressure in the southern North Sea, November 1947 to December 1948.] Annalen der Meteorologie, 2(3–4):79–85, March–April **1949.** 4 figs., 3 refs. Summary in German and English p. 79. **DWB**—Pressures in 60°N., 0° longitude show a "real" 25.2 day periodicity marked by especially deep minima at troughs, showing the passage of depressions. Positions and tracks of these depressions are plotted, illustrated by synoptic charts and their development described. The cause is considered to be a stationary primary (stratospheric) wave of H. v. Ficker's classification. *Subject Headings:* **Pressure changes, North Sea.**—*C.E.P.B.*

2–119 551.543.3

Weickmann, Ludwig, **Auftreten von 16 tägigen Wetterrhythmen und ihre kalendermässige Bindung.** [Occurrence of 16 day period in weather rhythms and their dependence on the calendar.] Meteorologische Rundschau, 1(15–16):459–464, Sept.–Oct. **1948.** 5 figs., 2 tables, 6 refs. **DWB**—An attempt to determine by synoptic and statistical methods the amplitude and spatial distribution of a 16 day pressure wave or cycle in the northern hemisphere. The author claims that aerological data, and surface temperature data from the Alps, substantiate the vertical as well as horizontal movement of these waves (there are two opposing wave motions which have axes or origins in different parts of the northern hemisphere, thus complicating the picture). The 60 year pressure record for Karlsruhe is subjected to

harmonic analysis, and pressure and temperature records for Munich and Hohenpeissenberg used to show vertical development of wave. *Subject Headings:* **Cycles, Long range forecasting.**

2–120 551.547.3

†Fleagle, Robert G., **Quantitative analysis of factors influencing pressure change.** Journal of Meteorology, 5(6):281–292, Dec. **1948.** 11 figs., 3 tables, 27 refs., 28 equations. Abstract p. 281. Summary p. 290. **DWB**—A study of the relative importance of local expansion, vertical motion, horizontal divergence, etc., in the troposphere, and of density changes in the sub-stratosphere, in producing surface pressure changes. Work of Dines, Hesselberg, Haurwitz, Van Mieghem, Bjerknes and Holmboe, Solberg and Charney cited. The author calculates relationships during 132 cases in cyclonic and anticylonic periods and concludes that the effect on surface pressure changes of horizontal displacement in the two or three kilometers just above the tropopause is the greatest and that of advection in the lower troposphere is next greatest. Results illustrated graphically and tested statistically. *Subject Heading:* **Pressure changes.**

WIND

2–121 551.55(44)

Vialar, J., **Les vents régionaux et locaux.** [Regional and local winds.] Ministère des Travaux Publics des Transportes et du Tourisme, Paris, **1948.** 52 p., 2 illus., 9 charts. Mémorial de la Météorologie Nationale. **DWB**—Contains detailed charts of local winds in France. Alphabetical lists of names of regional winds and general terms for winds, proverbs and sayings about various winds in different localities of France. First of two publications on winds: the second will consist of a synoptic study of these winds. *Subject Headings:* **Special winds, France.**

2–122 551.551:551.511

†Frost, R., **Atmospheric turbulence.** Royal Meteorological Society, Quarterly Journal, 74(321–322):316–338, July–Oct. **1948.** 7 figs., 18 tables, 22 refs., 53 equations. Summary p. 316. **DWB**—Modification of classical theory of turbulence to show that K is not constant with height but is represented by a power law, the rise of which helps explain observed lapse rates and variations of wind with height and other problems of atmospheric diffusion and stability. Elaborate tables and graphs are given to show the variations of the many parameters with height, stability, roughness, time of day etc., over sea and land. Practical rules are deduced from theory checked against observations. *Subject Heading:* **Turbulence.**

2–123 551.551:551.554

Sutton, O. G., **The application to micrometeorology of the theory of turbulent flow over rough surfaces.** Royal Meteorological Society, Quarterly Journal, 75(326):335–350, Oct. **1949.** 3 tables, 9 refs., 36 equations. Abstract p. 335. **DWB**—This important mathematical paper extends the theory of turbulent flow to rough surfaces. For the boundary surface layer the author introduces the concept of "friction velocity" u_*, defined as root (shearing stress/density) and deduces that

$$\frac{\bar{u}}{u_*}=\frac{I}{k}\log_e\left(\frac{u_* z}{\nu}\right)+\text{const.} \qquad (7)$$

$\bar{u}$ = mean velocity, ν is kinematic velocity. In meteorology u_* is approximately $\bar{u}/10$. Over a "rough" surface (one in which the irregularities project through the laminar layer) viscosity can be ignored and Sutton derives an expression (9) resembling that of Rossby and Montgomery (1935) (13), involving the "roughness length" z_0 (taken as 1/30 of average diameter of obstacles), but neither (9) nor (13) approach (7) for $z_0=0$. To obtain a generally applicable expression, he introduces "macroviscosity" $N=u_* z_0$, giving

$$\frac{\bar{u}}{u_*}=\frac{I}{k}\log_e\left(\frac{u_* z+N}{N+\nu/9}\right) \qquad (17)$$

The corresponding power law of wind profile is given (20). N specifies the quality of a surface better than z_0. Table I gives values of u_*, z_0 and N for various surfaces; only ice and calm sea are aerodynamically smooth for winds of 5 m./s. at 2 m. height. Part II deals

with diffusion over rough surfaces, deriving lateral and vertical "generalized diffusion coefficients" (32, 33) for use in studying, e.g., concentrations of impurities; these are found to agree well enough with observations. *Subject Headings:* **Mechanics of the atmosphere, Turbulence, Micrometeorology.**

2–124 551.553.6

Pagnon, Armand and Romani, Lucien, **Sur la répartition statistique des vitesses du vent en un lieu donné.** [On the statistical distribution of wind speeds at a given place.] Académie des Sciences, Paris, Comptes Rendus, 226(26):2170–2172, June 28, **1948.** 3 figs. **DWB**—By plotting the frequency of wind speeds for a point on log probability paper, a discontinuity is noted between 8 and 14 m. per second, accounted for by the fact that low wind speeds correspond to a continuous, unperturbed field of pressure, while stronger winds are produced by cyclonic disturbances and correspond to eddies with vertical axes moving at high speed. *Subject Heading:* **Wind variations.**

2–125 551.554:551.507

†Roll, Hans-Ulrich, **Vergleichende Betrachtung und Kritik von Windprofilmessungen auf See.** [Comparative criticism and discussion of wind-profile measurements over the sea.] Annalen der Meteorologie, 2(3–4):71–78, March–April **1949.** 7 figs., 12 refs. Summary in English p. 71, German p. 78. **DWB**—Wind velocity above smooth seas (Roll, North Sea; Montgomery, N. Atlantic; Shuleikin, Black Sea) at H 10–1,000 cm. is proportional to log H. Above rougher seas velocity increases more rapidly above 100 cm. Errors due to swinging of the boat and to swell are negligible. Wind measurements in the bow of an anchored ship may be 50–100% too great. *Subject Heading:* **Wind profile measurements.**—*C.E.P.B.*

2–126 551.555.1:551.555.9(262)

†Schneider-Carius, Karl, **Die Etesien.** [The etesian.] Meteorologische Rundschau, 1(15–16):464–470, Sept.–Oct. **1948.** numerous refs. **DWB**—A lengthy discussion of the historical, synoptic, aerological and geographical aspects of the etesian, a hot, dry, northwest wind which prevails in the eastern Mediterranean (Egypt, Palestine, Turkey, Greece and Crete), especially in summer. It is maintained that this wind, although occurring with great frequency and duration, is neither a trade wind nor a monsoon in its true sense. *Subject Headings:* **Special winds, Upper air winds, Eastern Mediterranean.**

2–127 551.555:551.576(969)

Leopold, Luna B., **The interaction of trade wind and sea breeze, Hawaii.** Journal of Meteorology, 6(5):312–320, Oct. **1949.** 9 figs., table, 6 refs. Abstract p. 312. **DWB**—The effect on the prevailing winds and clouds of the mountain barriers on the various islands of the Hawaiian chain, and complications due to land-sea breeze circulation, are discussed in detail with many diagrams illustrating local effects on cloud, wind and precipitation. It is concluded that air flows over the low mountains, but higher ranges "split the trades," or cause the air to flow around them. *Subject Headings:* **Trade winds, Cloud systems, Orographic effects, Hawaii.**

2–128 551.555.1:551.553.3

Wentworth, Chester K., **Directional shift of trade winds at Honolulu.** Pacific Science, 3(1):86–88, Jan. **1949.** 2 figs. **DWB**—Evidence of real progressive shifting from high frequency of northeast winds to east winds from 1909–1939, with a reversal since 1939. Illustrated by means of 5 year running averages. *Subject Heading:* **Trade wind variations.**

2–129 551.555.3:551.5:86

Ficker, Heinrich v., and Rudder, Bernhard de, **Föhn und Föhnwirkungen, der gegenwärtige Stand der Frage.** [Föhn and the föhn effect; the present status of the question.] Leipzig, **1943.** 112 p., 23 figs., 2 tables, 96 refs., indexed. **DWB**—**Meteorology of Föhns,** by von Ficker includes history, origin, geographical distribution by continents, origin of north and south föhns in Alps. **Föhn Action in Nature** by von Ficker. **Biological Effect of the**

Föhn by de Rudder: symptoms, diseases, explanation of effect on health and disease, therapy. *Subject Headings:* **Föhn winds, Medical meteorology.**

2–130 551.555.3(43)

Flohn, Hermann, **Stau- und Föhnerscheinungen im Heilbronner Becken.** [Upslope and föhn phenomena in the Heilbronner Basin.] Meteorologische Rundschau, 1(11–12):345–346, May–June **1948.** fig., 9 refs. **DWB**—Description of orographic effects on air-flow, precipitation and cloudiness in the Heilbronn Basin of the Neckar near Stuttgart (between the Odenwald and Schwarzwald). Interesting instances are cited, from the point of view of a careful observer and aerologist. *Subject Headings:* **Föhn winds, Germany.**

2–131 551.557(43)

*Berg, Hellmut, **Ergebnisse von Höhenwindmessungen mit Hilfe elektrischer Peilungen. (Köln, Juni 1942 bis Mai 1943.)** [Results of wind aloft measurements by means of radio location equipment. (Cologne, June 1942 to May 1943.)] Meteorologische Rundschau, 1(15–16):479–483, Sept.–Oct. **1948.** fig., 10 tables, 7 refs. **DWB**—Results of 350 wind-aloft soundings, made by following radiosonde balloons with radio location equipment, are analyzed, and presented in graphical (wind-rose) and tabular form. Not only average monthly values of wind direction and speed (frequencies and vectors) are given, but the data are broken down according to clear, cloudy and rainy days, and the interdiurnal change in scalar and vectorial wind is computed for the four seasons up to 10 km. height. The data obtained by this method give a much more representative picture at high levels than do data from theodolite observations as the latter fail when there are clouds or high winds aloft. *Subject Headings:* **Upper air winds, Germany.**

2–132 551.557:551.551

*Durst, C. S., **The fine structure of wind in the free air.** Royal Meteorological Society, Quarterly Journal, 74(321–322):349–360, July–Oct. **1948.** 6 figs., 3 tables. Summary p. 349. **DWB**—Tabular and graphical results of 21 sets of photographic observations on single and dual smoke puffs ejected at heights of from 5,000 to 20,000 feet in clear air (between Sept. 1946 and Oct. 1947) to determine small variations of wind with height, distance, time and wind speed. Fluctuations at high levels are comparable in periodicity to surface wind fluctuations and those at low levels are correlated with those higher up, but no connection has appeared between wind speed, stability, or type of air and the magnitude of variations. Conditions on cloudy days would probably prove much different from these results obtained during clear weather. *Subject Headings:* **Upper air winds, Turbulence.**

2–133 551.557:551.513(57)

*Flohn, Hermann, **Zum Klima der freien Atmosphäre über Sibirien. III. Die vertikale Windverteilung über Jakutien.** [On the climate of the free atmosphere over Siberia. III. The vertical wind distribution over Yakut.] Meteorologische Rundschau, 1(15–16):475–478, Sept.–Oct. **1948.** fig., 8 tables, 11 refs. **DWB**—The author uses little known wind-aloft data (1926–1930) for three Siberian stations: Petropavlovsk, Yakutsk and Verkhoiansk, to determine not only the frequency of winds aloft and the mean air movement of circulation over eastern Siberia, but by indirect means the average seasonal height of the tropopause (6 km. in winter, 11 km. in summer), and even the horizontal temperature distribution. *Subject Headings:* **Atmospheric circulation, Upper air winds, Siberia.**

2–134 551.557:551.513

Lettau, Heinz, **Maximalwerte der Windgeschwindigkeit als Funktion der Erdrotation.** [Maximum values of wind velocity as a function of the earth's rotation.] Meteorologische Rundschau, 1(15–16):451–453, Sept.–Oct. **1948.** 3 tables, 3 refs., 6 equations. Summary. **DWB**—Table gives maximum winds at various heights over Marquin and Hoek van Holland—390 km. per hour a km. *Subject Headings:* **Upper air winds, Atmospheric circulation, Holland.**

2–135 551.558:551.551:656.7

Briegleb, William C., **The wind and you.** Flying, 44(5):30–32, 52, May **1949.** illus. **DWB**—Experiences of a pilot in flying in arid and mountainous regions. States that thermals

sometimes extend up to 20,000 ft., and base of cumulus clouds over thermals at 23,000 ft. above sea level. Dust carried to over 15,000 ft. Some dust thermals carry violent down drafts. Diagrams indicate nature and origin of thermals. *Subject Headings:* **Turbulence, Vertical motion, Aeronautical meteorology.**

2–136 551.558:629.13

Eyraud, R., **Influence des courants verticaux sur les avions.** [Influence of vertical winds on aircraft.] Journal Scientifique de la Météorologie, 1(1):23–31, Jan.–March **1949.** 8 figs., 36 equations. Summary in French, English and Spanish p. 23. **MH-BH**—Theory and application of the theory of turbulence as it concerns vertical motions in the free atmosphere, to the stabilizing of aircraft in flight, with particular reference to improving observations made from airplanes which are used in studying turbulence. *Subject Headings:* **Turbulence, Aeronautical meteorology, Vertical winds.**

AQUEOUS VAPOR AND HYDROMETEORS

2–137 551.574

Dessens, Henri, **Sur les divers modes de condensation de la vapeur d'eau atmosphérique.** [On the different methods of condensing atmospheric water vapor.] Académie des Sciences, Paris, Comptes Rendus, 226(4):351–352, Jan. 26, **1948.** fig., ref. **DLC**—Effect of sodium chloride on formation of ice from supercooled water, etc. *Subject Heading:* **Condensation.**

2–138 551.574.1

*Menzl, Oswald, **Kernzählungen im Böhmischen Mittelgebirge.** [Nuclei counts in the Bohemian Mittelgebirge.] Meteorologische Rundschau, 2(1–2): 45–48, Jan.–Feb. **1949.** 6 tables, 13 refs. Summary in German p. 45. **MH-BH**—Counts of nuclei on Donnersberg at heights of 520 to 853 m. in different air masses, wind directions and velocities, visibilities, sky tints, humidities and cloud amounts, are expressed in numerous tables. Local differences are investigated. Whirled-up dust and pollen were found to increase the counts, even in rain-squalls. *Subject Heading:* **Nuclei count.**—*C.E.P.B.*

2–139 551.574.42

Garrigue, Hubert, Poyart, Robert, and Hautefeuille, Pierre, **Sur le givrage des lignes électriques.** [On rime formations on electric lines.] Académie des Sciences, Paris, Comptes Rendus, 228(7):593–594, Feb. 14, **1949.** **DLC**—Results of tests made at special station on the summit of the Puy de Dome to show the nature of rime formations with winds of different directions, etc., and with a variety of formations. *Subject Headings:* **Rime formation, Icing.**

2–140 551.575:551.582(431)

*Wörner, Heinrich, **Der Nebel in Ostpreussen.** [Fog in East Prussia.] Forschungs-und Erfahrungsberichte des Reichswetterdienstes, Series B, No. 17, Berlin, **1944.** 29 p., 18 charts, 10 tables. Originally classified secret. **DAWS**—Fog from an aviation standpoint: number of days each month from 54 stations for 12 areas; duration in hours; frequency of various types of fog: radiation, synoptic, sea and frontal fog; vertical depth of fog. Charts show annual, winter, summer, foggiest, least foggy months, and frequency of different kinds of fog in winter and summer. *Subject Headings:* **Fog, Climatology, Prussia.**

2–141 551.576.11

Hewson, E. Wendell, **The dissipation of scattered and broken cloud.** Royal Meteorological Society, Quarterly Journal, 74(321–322):243–265, July–Oct. **1948.** 14 figs., 19 refs. Summary p. 243. **DWB**—A comprehensive treatment of the subject based on the earlier work of Shaw, and refinements by J. Bjerknes, Petterssen, Beers, Normand and others. In addition to careful consideration of the theoretical aspects of terrestrial and cloud radiational effects, the author takes up the various criteria which may determine whether or not clouds will dissipate; the use of the slice method; computation of time required for dissipation; effects of liquid water content of clouds, solar radiation, widespread subsidence or ascent of air. Each step is illustrated by means of tephigram charts showing lapse rates and critical limits. The

paper was prepared in 1942 but not published until 1948 due to the war. *Subject Heading:* **Cloud dissipation.**

2–142 551.577.1(795)

Platzman, George W., **Computation of maximum rainfall in the Willamette Basin.** American Geophysical Union, Transactions, 29(4):467–472, Aug. **1948.** 2 tables, 5 refs., equation. Abstract p. 467. **DWB**—Using estimated maximum dew points and wind speeds, the author develops a maximum rainfall formula along the lines suggested by Bjerknes (1940) and Showalter (1944). As the prevailing flow which gives orographic rainfall in the Willamette Basin is from the west or southwest, data from the radiosonde station at Medford and the surface observations at Sexton Summit, Oregon, were used in calculating coefficients. From these data the maximum precipitation on a depth duration basis is computed and presented in tabular form. *Subject Headings:* **Maximum rainfall, Oregon.**

2–143 551.577.2:551.577.3:551.583(42)

*Belasco, J. E., **Rainless days of London.** Royal Meteorological Society, Quarterly Journal, 74(321–322):339–348, July–Oct. **1948.** 3 figs., 8 tables, 4 refs., equations. Summary p. 339. **DWB**—Seventy years of rainfall records for Kew (1878–1947) were analyzed with respect to frequency and duration of occurrence of rainless days. The results are given in tables and graphs; showing the day to day, month to month and year to year variation in frequencies. The maximum occurs in May and June and the minimum in October or November. Spells of 6 days duration have occurred at all seasons, and of over 14 days from February through October. Synoptic conditions prevailing at the incidence and termination of the longest dry spells are summarized. Relation to singularities in other elements shown. There seems to be a decided upward trend in annual number of rainless days and in long dry periods, from 1890 to 1910 and 1920 to 1945, but a downward trend from 1910 to 1920. *Subject Headings:* **Precipitation variations, Droughts, Climatic variations, London.**

2–144 551.577.34:551.5:67(09)(73)

Lynch, Henry B., **Pacific Coast rainfall-wide fluctuations in hundred years: an understanding of rainfall variations may have the utmost importance to farmers and industry dependent upon ample water supply.** Western Construction News, 23(7):76–80, July **1948.** 4 figs., 12 refs. **DA**—The charting of fluctuations over the past 100 year period is the initial step toward accurately forecasting the approach of wet and dry seasons and periods. *Subject Headings:* **Precipitation variations, History, United States.**

2–145 551.577.34

Mämecke, Karlheinz, **Die Periode 1901–1925 und ihr Verhältnis zur Periode 1881–1930 in Bezug auf den Jährlichen Gang der Niederschläge in Thüringen.** [The period 1901–1925 in comparison with the period 1881–1930 in the annual variation of rainfall in Thuringia.] Meteorologische Rundschau, 2(1–2):20–22, Jan.–Feb. **1949.** fig., 3 tables. **MH-BH**—The period 1881–1930 was rainier in summer and drier in the remaining seasons than 1901–1925. *Subject Heading:* **Precipitation variations.**—*C.E.P.B.*

2–146 551.577.36(436)

Steinhauser, F., **Über die Veränderlichkeit des Niederschlags in Österreich auf Grund hundertjähriger Beobachtungsreihen.** [On the variability of rainfall in Austria on the basis of 100-year series of observations.] Wetter und Leben, 2(3–4):53–58, July **1949.** fig., 3 tables, 4 refs. **MH-BH**—Detailed frequency tables of monthly and annual rainfall at Vienna and Klagenfurt (N. and S. of Alps) and values of mean deviation and percentage variability. *Subject Headings:* **Precipitation frequencies, Climatology, Austria.**—*C.E.P.B.*

2–147 551.577.37:551.461.2

Becken, Friedrich W., **Sturmfluten und Regenmengen in Cuxhaven.** [Storm tides and amount of rain in Cuxhaven.] Annalen der Meteorologie, 2(1–2):51–53, Jan.–Feb. **1949.** fig. **DWB**—In connection with sewer construction, 157 observations of the level of the lower Elbe at Cuxhaven exceeding +2.5 m. were selected from 40,000 (1919–1948), and the daily

rainfall tabulated from 4 days before to 2 days after. In the first 4 days the mean total was 29.4 mm. compared with 4-day average of 7.8 mm. The maximum rainfall came 40 hours before the floods. This result is expected because the storm floods are caused by cyclones. *Subject Headings:* **Excessive precipitation, Storm tides.**—*C. E. P. B.*

2–148 551.577.5:551.582:551.506(675)

Regnier, M. E., **Le regime pluviometrique dans la Province de Costermansville.** [The rainfall regime in Costermansville Province.] Bulletin Agricole du Congo Belge, 39(4):875–892, Dec. 1948. 7 figs., tables. **DWB, MH-BH**—History and uses of meteorological observations in this area. Photographs show topography, location of stations, etc. Data on rainfall analyzed and included for a large number of stations, mostly with short records. Author states that 30 years record are necessary for proper analysis, but shorter records are useful for some purposes, especially in colonization. *Subject Headings:* **Influence of rainfall, Climatology, Meteorological data, Belgian Congo.**

2–149 551.577.53:551.574.1

Bergeron, Tor, **The problem of artificial control of rainfall on the globe. I. General effects of ice-nuclei in clouds.** Tellus, 1(1):32–43, Feb. 1949. 10 figs., 23 refs. Abstract p. 32. **II. The coastal orographic maxima of precipitation in autumn and winter.** Tellus, 1(3):15–32, Aug. 1949. 10 figs., table, 10 refs. Abstract p. 15. **DWB**—In Part I the author goes into the details of the theory of cloud structure and physics as developed by Wegener, Findeisen and himself, and brings the theory up to date in the light of recent experiments on artificial condensation conducted in the U. S., Hawaii and Australia by Schaefer, Leopold, Kraus and others. The conditions under which colloidal or thermodynamic stability or instability would result, from natural or artificial stimuli, are described and illustrated. The mechanics of producing stabilizing effects by "over-seeding" is discussed. He considers the ideal optimum amount to be ($\nu = 10^3$) for "trigger" action.

In Part II the author describes winter precipitation (snow or rain) along flat coasts and steep slopes with examples from Sweden, Norway and Holland. Three different frictional effects leading to maximum precipitation in coastal areas, and possible secondary maximums farther inland are noted. It is shown that the conditions ideal for getting the maximum effect by seeding are those when there is already an abundance of precipitation and by so doing the drier inland areas would be robbed of moisture. A better scheme would be to "over-seed" clouds in certain areas or certain times to stabilize them and prevent release of moisture or produce a steady or non-violent release. *Subject Headings:* **Artificial precipitation, Condensation nuclei.**

2–150 551.578.46(43)

*Manig, Marianne, **Die Schneedecke in den südlichen Sudeten und in Oberschlesien.** [The snow cover in southern Sudeten and in Oberschlesien.] Meteorologische Rundschau, 1(15–16):471–473, Sept.–Oct. 1948. 6 tables. **DWB**—Data on depth and number of days with snow cover given for eight stations. *Subject Headings:* **Snow cover, Germany.**

2–151 551.578.46

*†Rikhter, Gavriil Dmitrievich, **Snezhnyi pokrov ego formirovanie i svoistva.** [Snow cover, its formation and characteristics.] Izdat. Akademii Nauk, SSSR, Moscow, 1945. 120 p., 21 figs., 42 tables, 102 refs. **DLC**—A systematic summary based mainly on Russian source-material, of the many problems connected with snow as water supply, means of transportation or hindrance to traffic, etc. Bibliography of 90 Russian articles and a dozen English, American and German references to snow cover. *Subject Heading:* **Snow cover.**

2–152 551.588.6:551.579.2

Wilm, Harold G., **The influence of forest cover on snow-melt.** American Geophysical Union, Transactions, 29(4):547–556, Aug. 1948. 4 figs., 2 tables, 16 refs. Abstract p. 547. Discussion by Walter U. Garstka, p. 556–557. **DWB**—As a result of recent investigations in Colorado, the author concludes that a forest cover which is not too dense provides the best medium for snow interception and retention. Any vegetative covering reduces wind move-

ment and insolation and thus retards evaporation. There is evidence that runoff is somewhat retarded by a forest cover. There has been considerable disagreement in the past half century over the effect of forests on runoff, as evidenced by literature cited in this article, but on the whole the author agrees with J. E. Church that "a fir forest possessing a maximum number of glades" is the most desirable for snow conservation. *Subject Heading:* **Snow-melt, Forest influences.**

2–153 551.579.5(795)

Piper, Arthur M., **Runoff from rain and snow.** American Geophysical Union, Transactions, 29(4):511–520, Aug. **1948.** 2 figs., 3 refs. Abstract p. 511. Discussion by E. N. Peterson, p. 520–524. fig. **DWB**—By an analysis of 25 years of runoff data from three rivers in central Oregon (the John Day, the Metolius and the Deschutes), representing three different degrees of stability of runoff, the author shows the effect of ground water storage which may produce a lag of five years in response to excessive or deficient annual precipitation. A detailed discussion of the mechanics of infiltration and aeration, runoff from snow, bases for forecasting stream flow and a lengthy discussion of the latter subject by E. N. Peterson, is included. *Subject Headings:* **Infiltration, Runoff, Forecasting stream flow, Oregon.**

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

2–154 551.58:551:91

Hare, F. Kenneth, **Dynamic climatology in geographic studies.** Revue Canadienne de Geographie, 2(1):9–16, March **1948.** 2 figs., 8 refs. **DWB**—Discussion of usefulness of new concepts in climatology for the geographer who has heretofore been limited to the so-called physical climatology or descriptive methods rather than the analytical. Possibility of combination of elements such as wind and fog, better interpretation and effective description of climate for amateur purposes. *Subject Headings:* **Climatology, Geography.**

2–155 93:551.58(09)

†Selianinov, Georgii Timofeevich, **Istoriia sozdaniîa "Klimatov Zemnogo Shara" A. I. Voeikova i ikh znachenie v razvitii klimatologii.** [History of the compilation of the "Climate of the Earth" of A. I. Woeikoff, and its significance in the development of climatology.] Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR Izvestiîa, 80(1):69–83, Jan.–Feb. **1948.** 30 refs. **DLC, DWB**—Review of a number of important works on climatology by A. I. Woeikoff and his contemporaries: Hann, Wild, Köppen, Supan, and recent writers like K. Knoch, Hettner and Geiger. Voeikov (Woeikoff) published extensively in Russian and German geographical and meteorological periodicals between 1875 and 1908, writing in English, German and Russian. *Subject Headings:* **Climatology, History.**

2–156 551.582(02)(47)

*†Borisov, A. A., **Klimaty SSSR.** [Climates of the U.S.S.R.] Uchpedgiz, Moscow, **1948.** 224 p., 37+ figs., 46 tables, 64 refs. **DLC**—This publication is intended as a text for advanced students in universities. The first section is devoted to a discussion of the various climatic elements in logical order: solar radiation, pressure and general circulation, temperature, humidity, cloudiness and sunshine, snow cover and evaporation, with special attention to their annual and geographical variation. The second part takes up the climate of various *sections* of the USSR divided according to maritime regions, plains and lowlands, and mountainous regions. Some very interesting charts and tables are presented for the first time in one volume: intensity and total solar radiation for various parts of European and Asiatic USSR in various seasons; frequency of air mass types in various regions; new January and July isobar, wind and isotherm charts for the whole USSR; earth temperatures at several depths; height and duration of snow cover and evaporation dates; a table of world and USSR extremes; thermal wind roses; characteristic features of various regions, etc. Several elaborate colored isoline fold-in charts are in a pocket in the back: one a detailed chart of evaporation; one "climatic charts" shows total annual precipitation, January and July temperatures, pressures, winds, and air

flow, boundary of permafrost and ice in the sea; one is a "climatic zone" chart by L. S. Berg showing movements of air masses and frequency along various axes; one a Köppen type climatic classification chart after Voznesensky (revised); and one shows bar charts of annual march of precipitation over all the USSR.

Several errors strike the eye during a casual perusal of this volume. Mention is made of the early observations made in Russia under the direction of the "Palatine Meteorological Society" with a note that that society was formed in Rome and got its name from the Palatine Hill in Rome, when actually it was founded at Mannheim and named from the "Palatinate" or "Pfalz," a province of Germany along the Rhine above Cologne. Also a chart of total solar radiation received on a horizontal surface throughout the USSR bears a footnote stating that: "the total solar radiation received on a horizontal surface is greatest at Bukhta Tikhaya, next at Pavlovsk and least at Tashkent," when the data both on the chart and in the accompanying table show that the exact reverse is true, the ratio being 14:40:102 thousand calories per year.

It is interesting to note that the author still accepts −68°C. (−90°F.) at Verkhoiansk as the lowest temperature on record on earth. *Subject Headings:* **Climatology, Textbooks, USSR.**

2–157 551.582(43)

*†Menzl, Oswald, **Das Klima von Tellnitz-Liesdorf.** [The climate of Tellnitz-Liesdorf.] Meteorologische Rundschau, 2(3–4):83–89. March–April **1949.** 2 figs., 7 tables, 13 refs. **MH-BH**—The station is at 50°44′N., 13°58′E. on the southern slope of the Erzgebirge. The usual monthly mean and extreme values and frequencies are given. *Subject Headings:* **Climatology, Germany.**—*C.E.P.B.*

2–158 551.582:551.586:63(477)

*†Tervinsk, V. N., ed., **Klimat rostovskoĭ oblasti i krasnodarskogo kraĭa.** [The climate of the Rostov and Krasnodarsk regions.] (ed. V. N. Tervinsk). Rostovskoe nad Donu Upravlenie Gidromet. Sluzhby. Rostoblizdat, Rostov na Donu—**1938.** 140 p. charts, figs., 22+ tables, bibliog. **DAWS**—A collection of several articles on various aspects of the climate of this region: P. L. Viazovskiĭ: **Physico-geographic conditions in the Azov-Black Sea region and their influence on climate.** I. V. But: **Atmospheric processes controlling the climate of Rostov and Krasnodarsk regions**; V. V. Torletskaia: **Solar radiation**; N. A. Stepanova: **Temperature of the air**; G. N. Chasovnikov, **Temperature of the soil**; I. V. But and V. V. Torletskaia: **Humidity of the air**; G. N. Chasovnikov: **Precipitation**; U. S. Timofeeva: **Snow cover**; P. L. Viazovskiĭ and G. N. Chasovnikov: **Pressure of the air and wind**; P. L. Viazovskiĭ: **Agroclimatic provinces of Rostov and Krasnodarsk regions.** Data for 56 stations. Many interesting discussions, supplemented by figures and tables of air masses, fronts, effects of solar radiation, air and soil temperature, frost, humidity, precipitation, snow cover, etc. (In Russian). *Subject Headings:* **Climatology, Ukraine, USSR.**

2–159 551.582(02)(74)

*U. S. Weather Bureau, **The climatic handbook for Washington, D. C.** [ed. Richmond T. Zoch.] Weather Bureau Technical Paper No. 8, U. S. Government Printing Office, Washington, D. C., **1949.** Price $1.00. 235 p., 137 tables. **DWB**—This volume required several years to compile and edit, and contains a wealth of material on the climate of Washington, D. C. and its vicinity, most of which has never before been published. No other climatological publication ever included so much analytical data and so many intricate graphs and diagrams for determination of the probabilities of occurrence of various weather elements, singly or in combination, for any given spot. The record employed is confined to the period of 75 years from 1870 to 1945, although observations were made in great detail as early as 1844 and mean temperatures and rainfall are available for as early as 1820. The material used has been carefully annotated and the charts and tables explained in detail in the rather brief textual part which comes at the beginning. There follows about 100 large pages of tabular data: not only the usual average and extreme monthly and annual values of all the elements, but also such derived data as "heating and cooling degree days"; duration frequencies of many elements; frequencies of occurrence both actual and percentage-wise within various class limits; hourly

frequencies of rainfall, cloudiness, wind direction and speed, wet bulb and dew point temperatures, air pressure and pressure differences; frequencies of upper air winds, thunderstorms, tornadoes, frosts, river stages and finally, comparative mean temperature and precipitation data for places all over the world, arranged by continents. Eighty pages of elaborate graphs, isopleth and scatter diagrams, bar-charts and other methods of presenting tabular data in visual form, correlate and intercorrelate the various amount or frequency values of the elements with time or with each other. Then there are a number of pages of selected synoptic charts illustrating unusual or extreme conditions prevailing in Washington, and several pages of upper air wind roses. In fact, this publication presents so much intricate statistical data that only the author or an engineer or an actuary could hope to find and interpret all of the detailed material. At the very end, to reassure any hesitant purchaser that he would get his dollars worth, there are 36 plates showing scenes in and around Washington during or after selected cases of storm, flood, snow, glaze, tornado, etc. *Subject Headings:* **Climatology, Washington, D. C.**

2–160 551.582.1(99)

*Court, Arnold, **Meteorological data for Little America III; tabular and graphical results of observations made at the West Base of the United States Antarctic Service Expedition of 1939–1941.** U. S. Government Printing Office, Washington, D. C., 1949. 150 p., 9 figs., 31 tables. At head of title—U. S. Dept. of Commerce, Weather Bureau, Monthly Weather Review Supplement No. 48. **DWB,DLC—Meteorological results of the second Byrd Antarctic Expedition** (1934) compiled by George Grimminger and W. C. Haynes was published as Monthly Weather Review Supplements No. 41 and 42. The present volume, Supplement No. 48, contains the results of the expedition to the West Base at Little America III, near the site of the 1928 and 1934 bases. The author, who was meteorologist on that expedition, has compiled and presented in detail the radiosonde and pilot balloon observations; following which he presents tables of six-hourly surface observations, frequencies of various weather conditions, station pressure and temperature observations, surface wind records, data on snow accretion and earth temperatures. In graphical form are presented many temperature-height and wind rose diagrams for individual soundings and months, respectively. *Subject Headings:* **Climatological data, Antarctic.**

2–161 551.582.1:551.524.3(759)

Dietrich, Sigismond deR., **Florida's climatic extremes: cold spells and freezes.** Economic Geography, 25(1):68–74, Jan. 1949. **DLC, DWB**—A readable descriptive account of climatic conditions in Florida, with emphasis on frequency and severity of freezes and their economic consequences. *Subject Headings:* **Temperature extremes, Cold waves, Florida.**

2–162 551.582.1(579)

*Solov'ev, A. I., **Kuril'skie Ostrova,** [Kurile Islands.] Glavsevmorputi, Moscow, **1947.** Price 15 rubles. 305 p. **DLC**—Chap. VIII Klimat, p. 71–79, 4 tables. General character of climate, temperature, pressure, winds, humidity, precipitation, seasonal character of climate. Extensive data only for Shana on Etorofu. Chapter 10 "Soils and Ground Conditions," Chapter 11 "Rivers and Lakes," Chapters 14–17 "Regional Discussion," Chapter 9 "Oceanography of Surrounding Waters." *Subject Headings*: **Climatology, Kurile Islands.**

2–163 551.582.1:551.588.4(94)

Warren, H. N., **Bradfield scheme for "watering the inland." Meteorological Aspects.** (a) Possibilities of climatic amelioration; and (b) rainfall characteristics of river basins proposed to be harnassed. Australia, Commonwealth Meteorological Bureau, Bulletin No. 34, **1945.** 82 p., 7 appendices. **DWB**—Contains reports by various authorities on practicability of changing climate of central and western Australia. Vast irrigation and water storage scheme claimed to result in improved climate. Committee denies likelihood of improved climate, citing many statistics and reports by Kincer, Holzman and others who deny effect of storage or cultivation on rainfall or temperature except in immediate vicinity. Mr. E. T. Quayle, a member of the committee, presented a minority opinion in favor of climatic amelioration, based on his previous studies. *Subject Headings:* **Climatic amelioration, Australia.**

BIOCLIMATOLOGY

2–164 551.586:59

Gordon, Seton, **Climate of the northwestern seaboard and its relation to bird life.** Weather, 3(7):198–200, July 1948. plate. **DWB**—Effects of rugged conditions such as gales, heavy rainfall, etc., on the bird life of the Hebrides and west coast of Scotland. The winter of 1946–7 was especially severe and seems to have resulted in disappearance of many species once quite common here. *Subject Heading:* **Bioclimatology, Bird life.**

2–165 551.586:57:551.46

Hutchins, Louis W., **The bases for temperature zonation in geographical distribution.** Ecological Monographs, 17(3):325–335, July 1947. 8 figs., refs. **DA**—(Contribution No. 374 from the Woods Hole Oceanographic Institution.) Definition of zonation as it applies to marine biology; historical background; four types of zonation; importance of zonal typology; independence of north-south systems of zones of the four types; problems of comparing several coasts; applications of zonal typology; [Summary: (1) zonal boundaries of organisms are to be interpreted in terms of summer and winter temperatures; (2) four basic types of zonation can be recognized, each having a distinctive combination of summer or winter boundaries for its poleward and equatorward limits; (3) zones of the four types have distinctive configurations around the world and independent patterns of north-south occurrence depending on differences in distribution of summer and winter temperatures.] Limits for survival and re-population vary both as to upper and lower limits. Application to paleo-botany and climatology. *Subject Headings:* **Bioclimatology, Oceanography.**

2–166 551.586:59

Landsberg, H., **Bird migration and pressure patterns.** Science, 108(2817):708–709, Dec. 24, 1948. **DLC**—Speculation on probable use of major circulation patterns by birds in long-distance migrations. Resemblance of flight paths of birds to air trajectories cited. [Comment by C. Suffern in Science, 109(2826):209, Feb. 25, 1949, tells of experience in England during Feb. 1948 with redwings during a cold wave.] *Subject Heading:* **Bioclimatology, Bird life.**

2–167 551.586:551.506.8

Murneek, A. E., and Whyte, R. O., **Vernalization and photoperiodism.** A symposium. Chronica Botanica Co., Waltham, Mass., U. S. A., 1948. 196 p., figs., illus., tables, refs. **DLC**—Phenology. Effects of temperature, radiation, cold-periods, etc. Part in German. By various authors. *Subject Headings:* **Bioclimatology, Phenology.**

2–168 551.586:551.573:551.506.8

Miller, Erwin H., **Growth and environmental conditions in Southern California chaparral.** American Midland Naturalist, 37(2):379–420, 1947. **DLC**—Air temperature, soil temperature, evaporation rates, soil moisture and growth of the more common shrubs were measured from Dec. 1935 to Aug. 1938. Stations were located on north and south slopes at elevations from 1,500 to 5,500 ft. at 1,000 ft. intervals. Types of vegetation were sagebrush, chaparral, and broad-sclerophyll woodland. Evaporation rates varied greatly. Effect of altitude on rates slight, but slope exposure had a marked effect. Slight climatic differences produce different types of vegetation. Available soil moisture limited factor in inception of growth in spring. Air temperature, range, evaporation rates and insolation cause cessation. [From abstract by author.] *Subject Headings:* **Bioclimatology, Evaporation, Phenology.**

2–169 551.586:63(51)

†*Nuttonson, M. Y., **Ecological crop geography of China and its agroclimatic analogues in North America.** International Agro-Climatological Series, No. 7. International Institute of Crop Ecology, Washington, D. C., 1947. 28+ p., fig., 3 tables plus 2 folded tables, bibliog. **DWB**—Geography, climate and agricultural practices in China discussed. Chart and table show data for 214 stations in China, Manchuria and Korea. Mean temperature, frost data, average precipitation and humidity by months, length of record, station location and analogues for North America. *Subject Headings:* **Bioclimatology, Agricultural climatology, China.**

2–170 551.586:57

Osorio, Luis H., **El clima y los seres vivos.** [Climate and living beings.] Publicaciones del Ministerio de la Economia Nacional, Bogota, **1946.** XV+, 181p., 15 figs., bibliog. **DLC**—The author discusses bioclimatology, phytoclimatology, zooclimatology; zootechny-climatology; human climatology; psycho-climatology; ethno-climatology; socio-climatology; influence of solar activity on activities of humanity; adaptability to changes in climate; physioclimatology; physiological effects of: chemical constituents of atmosphere, solar radiation, ionization, radioactivity. *Subject Heading:* **Bioclimatology.**

2–171 551.586:63

Sprongl, Karl, **Witterung und Pilzwachstum in den Frühsommern 1947 und 1948.** [Weather and mushroom growth in the early summers of 1947 and 1948.] Wetter und Leben, 2(3–4):62–68, July **1949.** fig., table. **MH-BH**—At Gaaden near Mödling from mid-May to mid-July 1947 there were very few mushrooms, especially of moisture-loving species; in the same period in 1948 there were many. Rainfall of January to June was similar in the two years but in 1947 ground was frozen deep and much of the rain ran off; in open winter of 1948 it was absorbed. Also temperature was more variable in 1947 than 1948. Microclimatic soil studies are necessary. *Subject Headings:* **Agricultural climatology, Mushrooms, Microclimatology.**—*C.E.P.B.*

2–172 551.587:551.513.7

*†Ekhart, E., **Neue Beiträge zum Aeroklima Nordamerikas.** [New contribution to the aero-climatology of North America.] Geofisica Pura e Applicata, Milano, XII(5–6):210–253, **1948.** 14 figs., 5 tables, 27 refs. In German with German and English abstracts. **DWB**—Earlier works by the same author are expanded to include radiosonde data through 1941. Discussion of pressure, temperature and wind by seasons for various latitude and longitude zones and the effects of variations on general circulation between hemispheres, between stratosphere and troposphere, correlations between temperature of troposphere, tropopause and stratosphere and height of tropopause. No Canadian data available to author so charts are inaccurate for that area. A comprehensive work with many charts carefully drawn for the available data. *Subject Heading:* **Upper air climatology, North America.**

2–173 551.587

†Schneider-Carius, Karl, **Aerologie und Klimatographie des Atlantischen Ozeans.** [Aerology and climatography of the Atlantic Ocean.] Meteorologische Rundschau, 1(11–12):356–359, May–June **1948.** 10 refs. Summary in German p. 356. **DWB-DLC**—An analytical study of temperature, humidity, wind and cloud conditions in the trade wind zone of the south Atlantic, based on aerological data obtained on the "Meteor" expedition of 1925–1927. The author uses the scanty data for each portion of the south Atlantic to determine the height of the trade inversion or "Peplopause," and from these known and interpolated data determines the climatic characteristics of the entire region and even adjacent regions. *Subject Headings:* **Upper air observations, Climatology, Trade inversion.**

2–174 551.587(491)

Schwerdtfeger, Werner, **Kleiner Beitrag zur Kenntnis des Klimas im Seegebiet der Färoër I.** [Short contribution to the knowledge of the climate in the maritime region of the Faroe Islands.] Meteorologische Rundschau, 1(17–18):527–529, Nov.–Dec. **1948.** 3 figs., 4 tables. Summary in German and English p. 527. **DWB**—*Subject Headings:* **Upper air climatology, Faroe Islands.**

2–175 551.588.6:631.4(02)

*†Kittredge, Joseph, **Forest influences; the effects of woody vegetation on climate, water, and soil, with applications to the conservation of water and the control of floods and erosion.** McGraw Hill, New York, **1948.** 394 p., 24 figs., 71 tables, 381 refs. **DWB**—History, climatic regions; solar radiation and light; air temperature; wind; atmospheric moisture; precipitation; stream flow and interception; fog drip; evaporation of snow; influence of forest on evaporation

from soil; soil temperature; litter; soil moisture; transpiration; runoff and stream flow; floods; erosion; control of erosion. *Subject Headings:* **Forest influences, Hydrology, Textbooks.**

MISCELLANEOUS APPLICATIONS

VISIBILITY

2–176 551.591.1:551.591.361

Colberg, Rolf, **Sichtweiten über 300 km.** [Visibility exceeding 300 km.] Meteorologische Rundschau, 2(1–2):23–26, Jan.–Feb. **1949.** table, 9 refs., 12 equations. **MH-BH**—The upper limit of visibility geodetically possible (e.g., from aircraft) is $121/H_{km}$. km. The limit of visibility between mountain peaks is 720 km. and generally 500–600 km. Under actual conditions of lighting, unaided visibility is limited by scattering and even with quite clean air only exceeds 300 km. above the lowest layer of air. Between mountain peaks the limit is 400 km. These limits may be exceeded at times of unusual atmospheric refraction. *Subject Heading:* **Exceptional visibility.**—*C.E.P.B.*

2–177 551.591

Tschierske, Hilmar, **Bedeutung entfernter Wolken für die Beurteilung der Sicht.** [The importance of distant clouds for estimating visibility.] Meteorologische Rundschau, 2(1–2):26–29, Jan.–Feb. **1949.** 3 figs., table, 3 refs., equations. **MH-BH**—Assuming the height of a cloud from its form, the author gives tables for determining its distance by the angle of elevation, taking account of the height of the observer and the curvature of the earth. *Subject Heading:* **Visibility.**—*C.E.P.B.*

2–178 551.593.54

Siedentopf, Heinrich, **Optische Erscheinungen an Dunstgrenzen.** [Optical phenomena on haze boundaries.] Meteorologische Rundschau, 1(15–16):456–459, Sept.–Oct. **1948.** 5 figs., 7 refs., 20 equations. Summary. **DWB**—Theoretical development, discussion and graphical presentation of data for light density above and below haze-boundaries. Difference between curves compiled from Hulburt's formula (1941) and those compiled from empirical (searchlight) data shown for 20°, 40° and 60° solar elevation, and 0° to 180° solar azimuth, with greatest discrepancy at very high and low azimuths. *Subject Headings:* **Optical phenomena, Haze, Visibility.**

AURORA

2–179 551.594.51

Bates, D. R., **The intensity distribution in the nitrogen band systems emitted from the earth's upper atmosphere.** Royal Society of London, Proceedings, Ser. A., 196(1045):217–250, March 22, **1949.** fig., 37 tables, refs. **DWB**—A fundamental paper on subject indicated in title, comparing the author's theoretical results with observations from low-latitude and high-latitude auroras and sunlit auroras and the twilight sky. Author states that if, as is commonly supposed, the emission is due to electron excitation, temperatures of many thousand degrees Absolute must be assumed; but if excitation is due to heavy particles in incident auroral stream, vibrational temperatures much lower could be allowed. Negative as well as second and first positive systems discussed in detail. *Subject Heading:* **Auroras.**

2–180 551.594.51

Dufay, Jean, **Raies permises des atomes neutres d'oxygene et d'azote dans les spectres des aurores.** [Allowed rays of neutral atoms of oxygen and of nitrogen in auroral spectra.] Académie des Sciences, Paris, Comptes Rendus, 228(6):496–498, Feb. 7, **1949.** tables, refs. **DLC**—*Subject Heading:* **Auroras.**

2–181 551.593:551.594.5

Vassy, Arlette, Abadie, Paul, and Vassy, Mme. Étienne, **L'altitude des couches émettant la lumière du ciel nocturne dans les régions tropicales et sa variation au cours de la nuit.** [The altitude of the layers emitting the light of the night sky in tropical regions, and its variation during the course of the night.] Académie des Sciences, Paris, Comptes Rendus,

228(7):592–3, Feb. 14, 1949. DWB—Continuation of observations made on the Pic du Midi, with observations made at Tamanrass. *Subject Headings:* **Optical phenomena, Auroras.**

ACOUSTICS

2–182 551.596.1:551.594.7

†Cox, E. F., Atanasoff, J. V., Snavely, B. L., Beecher, D. W., and Brown, J., **Upper-atmosphere temperatures from Helgoland Big Bang.** Journal of Meteorology, 6(5):300–311, Oct. 1949. 15 figs., 6 tables, 55 refs., 5 equations. Abstract p. 300. **DWB**—An interesting analysis of acoustical and microbarometric data obtained at a series of stations extending for 1,000 km. south from Helgoland, where a giant blast occurred on April 18, 1947. Normal audibility occurred up to 120 km., and abnormal audibility from 200 to 250 or perhaps 500 km. to the south of the blast. From all available upper air soundings of temperature and wind, and from other data collected, the authors attempt to calculate all possible paths of abnormal sound or pressure waves, and to deduce the temperature profile up to 170 km. height. An excellent bibliography is appended giving an exhaustive list of references on anomalous propagation of sound in the atmosphere. *Subject Headings:* **Audibility zones, Upper air temperatures, Acoustical phenomena.**

OCEANOGRAPHY

2–183 551.465(02)

†Berezkin, Vsevolod A., **Dinamika moria.** [Dynamics of the sea.] Gidromet. Izdat. Sverdlovsk, Leningrad, **1947.** 683 p., 341 figs., 109 tables + XVII, numerous equations. Bibliog. p. 616–622. **DLC**—Oceanography from the point of view of a Navy Hydrographer. Contains three exhaustive chapters on (1) Waves, (2) Tides and (3) Currents, with a 60-page appendix giving extensive tables of harmonic analysis and other tables for calculation of tides anywhere on earth. Over 6 pages of references, both from native and foreign literature, on the subject of waves, tides and currents in the sea. The only applications of meteorology are to the currents or to waves in the sea. *Subject Headings:* **Ocean currents, Hydrography, Textbooks.**

2–184 551.465:551.5(02)

Shuleikin, Vasilii Vladimirovich, **Fizika morîa.** [Physics of the sea.] Izdat. Akademii Nauk, SSSR, Moscow, **1941.** 833 p., 562 figs., equations, fold chart (in pocket). **DLC**—The 3rd ed. of a text which was first published in 1932. The author is now head of the Hydrometeorological Service of the USSR. The text could be called "oceanography from the point of view of a meteorologist." An exhaustive and well illustrated text on many aspects of physical oceanography. After a discussion of the dynamics of ocean currents, tides and waves (surface and sub-surface) comes the chapter on "Thermal Properties of the Sea," wherein the effects of radiation, evaporation, exchange of water masses, ice, etc., are taken up systematically in relation to the heat exchange and economy of the sea; followed by over a hundred pages on the subject of "Climate and Weather," containing many interesting charts which show the effect of the seas on the continents and vice-versa. The last chapters comprise the subjects of "Optics of the Sea," "Acoustics," "Molecular Physics," "Biological Physics" and "Technical Physics of the Sea." Emphasis is placed on the Arctic Basin throughout the book. *Subject Headings:* **Physical oceanography, Dynamic climatology, Textbooks.**

2–185 551.465(02)

†Zubov, Nikolaĭ Nikolaevich, **Dinamicheskaîa okeanologiîa.** [Dynamic oceanology.] Gidromet. Izdat. Moscow, **1947.** 430 p., 229 figs., 56 tables, equations. Bibliography (130 refs.) p. 423–426. **DLC**—The author is head of the Institute of Oceanology in the Hydrometeorological Service and therefore approaches the subject of dynamic oceanography from the point of view of the researcher rather than the practical hydrographer or oceanographic meteorologist. After discussing the structure and physico-chemical characteristics of sea water, and the various surfaces and forces operating in the ocean, he takes up the exchange or mixing of water masses, then waves, tides, tidal phenomena and ice, ocean currents, wind and movements of ice, variations in sea level, and finally there are 40 pages on the interaction of the sea and atmosphere. *Subject Headings:* **Physical oceanography, Textbooks.**

PART II. CUMULATIVE ANNOTATED BIBLIOGRAPHY ON AEROBIOLOGY AND ITS APPLICATIONS TO METEOROLOGY

By: *Harris P. Kramer*

EXPLANATORY NOTE

AEROBIOLOGY is here defiined as the STUDY OF TRANSPORT AND DISSEMINATION OF ANIMAL AND PLANT FORMS IN THE AIR.

The bibliography is divided into two parts: Section 1. **Dispersion of Microorganisms in the Atmosphere,** which includes allergens, bacteria, fungi spores, pollen, seeds, and other microflora, as well as some references to air-borne disease and epidemiology.

Section II. **The Insect Population of the Air,** which considers effects of wind and air currents on behavior, migrations, and dispersal of insects, and overlaps in some cases the broader fields of meteorology and entomology, ecology, and forecasting of insect outbreaks (preventive entomology).

Techniques of research, instruments used, and meteorological applications are included in both sections.

The library where a work or periodical is located is designated by an appropriate symbol (see Explanations, P. iv).

The articles are listed chronologically within each of the two above mentioned sections, the earlier works appearing toward the beginning and the later works toward the end of each section.

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AEROBIOLOGY

SECTION I. DISPERSION OF MICROORGANISMS IN THE ATMOSPHERE
(551.510.42:551.586:576.8)

*B–1 Cunningham, David Douglas, **Microscopic examinations of air.** Calcutta, **1873.** 58 p., 10 figs., 4 diagrs., 2 tables, 14 plates. **DLC**—Observations on the nature of the solid bodies present in the atmosphere in and around Calcutta. Procedures of experimentation described; thorough and detailed. An interesting early work in the field of aerobiology. *Subject Headings:* **Aerobiology, Microorganisms, Calcutta, India.**

*B–2 Miquel, P., **Des organismes vivants de l'atmosphère.** [Living organisms of the atmosphere.] Paris, **1883.** 312 p., 86 figs. **DLC**—Many different organisms of the atmosphere discussed from the points of view of biology, medicine, meteorological dispersion, etc. A major early work. *Subject Headings:* **Aerobiology, Microorganisms.**

B–3 Hahn, Martin, **Die Bestimmung und meteorologische Verwertung Keimzahl in den höheren Luftschichten; nach vom Luftballon aus angestellten Beobachtungen.** [The determination and meteorological application of bacterial count in the upper air layers according to observations from a balloon.] Abdruck aus dem Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, 2:97–114, **1909.** 8 tables. **DWB**—*Subject Headings:* **Aerobiology, Microorganisms.**

B–4 Brownlee, J., **The mathematical theory of random migration and epidemic distribution.** Royal Society of Edinburgh, Proceedings, 31:262–289, **1911.** 9 diagrs., tables, refs., numerous equations. **DWB, DLC**—Using well-known statistical formulas the author tests the distribution or spread of epidemics in Hong Kong, London, Glasgow, etc., as well as distribution of animal and plant life. He concludes that the general principles which underlie both epidemic distribution in space and time and random migration are identical. Both can be deduced almost directly from the laws of chance through assumptions which have considerable *a priori* probability. *Subject Headings:* **Aerobiology, Epidemiology, Mathematical determinations.**

B–5 Schmidt, W., **Die Verbreitung von Samen und Blütenstaub durch die Luftbewegung.** [The dispersal of seeds and pollen by air currents.] Österreichische Botanische Zeitschrift, 67(1):313–328, **1918.** fig., tables, equations. **DA**—A detailed scientific work. Influence of wind velocity and height above ground on dispersal of seeds and pollen discussed. *Subject Headings:* **Aerobiology, Microorganisms.**

B–6 Trillat, A., **Influence de la variation de la pression barométric sur les gouttelettes microbiennes en suspension dans l'atmosphère.** [The influence of the barometric pressure on the microbe-bearing droplets in suspension in the atmosphere.] Académie des Sciences, Paris, Comptes Rendus, 170:538–540, March 1, **1920. DWB, DLC**—Laboratory experiments show that sudden increase of pressure accelerates fall of microbe-bearing droplets from atmosphere. The effect of barometric fluctuations on the vitality of germs in the atmosphere, their concentration in the lower strata, and their precipitation upon the soil may be an important factor in the variation of the bacteriological composition of the atmosphere. *Subject Headings:* **Aerobiology, Microorganisms, Atmospheric pressure.**

B–7 Stakman, E. C., Henry, A. W., Curran, G. C., and Christopher, W. N., **Spores in the upper air.** Journal of Agricultural Research, 24(7):599–606, **1923.** 2 plates, 3 tables. **DA, DWB**—Airplane collections made of spores over Mississippi Valley. Results of collections tabulated and discussed. Possibilities of such research enumerated. Organisms found at great heights, but no final conclusions drawn as to spread of blights, etc. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation.**

B–8 Shaw, Napier, **Note on organic bodies found in the air of Washington and London.** Monthly Weather Review, 52:139–141, March 1924. **DWB**—Deals with pollen, fungi spores, and other organic particle collections made over London and Cheam. Discussion of particles and possible sources. *Subject Headings:* **Aerobiology, Microorganisms.**

B–9 Mischustin, E., **Zur Untersuchung der Mikroflora der höheren Luftschichten.** [Investigation of microflora of the upper air.] Centralblatt für Bakteriologie und Parasitenkunde. II Abt., 67:347–351, 1926. 4 tables. **DLC**—Air collections made over Moscow area. Results discussed. *Subject Headings:* **Aerobiology, Microorganisms, Moscow.**

B–10 Meier, F. C., Stevenson, J. A., and Charles, V. K., **Spores in the upper air.** Phytopathology, 23:23, **1933.** (Abstract of paper presented at 24th annual meeting of American Phytopathological Society, 1932.) **DA**—Report of results of a series of spore-collecting flights. *Subject Headings:* **Aerobiology, Microorganisms.**

B–11 Wells, W. F., and Stone, W. R., **On air-borne infection. III. Viability of droplet nuclei infection.** American Journal of Hygiene, 20:619–627, **1934.** fig., tables, ref. **DSG**—It is shown that infection can remain suspended alive in air for periods which may permit its wide dissemination. Time and distance droplet nuclei travel depends on viability of organism more than on settling rate. Further study of bacterial behavior of air is needed. See also: Wells and Stone, **On air-borne infection. II. Droplets and droplet nuclei,** idem. p. 611–618. *Subject Headings:* **Aerobiology, Microorganisms, Air-borne disease.**

B–12 Berland, Lucien, **Premiers résultats de mes récherches en avion sur la faune et la flora atmosphériques.** [First results of my airplane searches for atmospheric fauna and flora.] Annales Société Entomologie de France, 104:73–96, **1935.** 6 figs., plate, 4 tables, 5 refs. **DA**—Technique of airplane collecting, described. Results tabulated. Important work in development of airplane collection. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation.**

*B–13 Horne, A. S., **On the numerical distribution of microorganisms in the atmosphere.** Royal Society of London, Proceedings, Ser. B., 117:154–174, **1935.** 17 tables, 10 refs. **DLC**—Observations made by plate method in orchards mostly under different environmental conditions. Data consist of numbers of fungal and bacterial growths. Evidence appears to warrant conclusion that microorganisms are distributed at random in the air. There are factors of weather, season, etc., modifying densities of microorganisms. *Subject Headings:* **Aerobiology, Microorganisms.**

B–14 Meier, F. C., **Collecting micro-organisms from the Arctic atmosphere; with field notes and material by Charles A. Lindbergh.** Scientific Monthly, 40:5–20, Jan. **1935.** 12 figs., refs. **DLC**—Evidence given of part played by air currents in distribution of fungi between northern lands. No detailed descriptions of spores caught given; rather an idea of variety of material collected over Davis Strait and northeastern Greenland. *Subject Headings:* **Aerobiology, Microorganisms, Arctic.**

B–15 Meier, F. C., **Effects of conditions in the stratosphere on spores of fungi.** National Geographic Society, Stratosphere Series, 2:152–153, **1936. DA**—Experiment to determine the effect of conditions in the stratosphere on spores of certain fungi known to be distributed by air currents near the earth's surface. *Subject Headings:* **Aerobiology, Microorganisms, Stratosphere.**

B–16 Proctor, B. E., **The microbiology of the upper air.** American Academy of Arts and Sciences, Proceedings, 69:315–340, Aug. **1934.** 6 figs., 6 tables, refs. **DLC**—Report of airplane collections of microorganisms at various levels in the upper air, up to 20,600 ft. Bacteria and moulds found above 19,600 ft. Yeasts and pollens above 16,000 ft. Spore-forming bacteria were predominant. 29 species of bacteria identified. Dust counts decreased somewhat at higher levels. Correlation of biological data and atmospheric conditions. Experiment to demonstrate resistance of certain isolated bacteria to cold included. *Subject Headings:* **Aerobiology, Microorganisms, Upper air.**

B–17 Proctor, B. E., **Microbiology of the upper air. II.** Journal of Bacteriology, 30:363, **1935.** 6 tables, 8 refs. **DSG**—Methods described and results tabulated and discussed. It was concluded that types of microorganisms found—largely types associated with soil and water—are subject to wide variations, due to upper air influences, to varied sources of organisms and to varying ability to survive. Vertical movement demonstrated to be at least several miles. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation, Upper air.**

B–18 Walker, George, **Bacterial content of the air at high altitudes.** Science, New Series, 82:442–443, Nov. **1935.** table. Short item telling of collections made up to 28,000 ft. The technique herein outlined was considered unsuccessful. Suggested that atmosphere from 20,000 to 28,500 ft. is sterile. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation, Upper air.**

B–19 Berland, Lucien, **L'exploration biologique de l'atmosphère en avion et l'emploi possible de cette méthod en météorologie.** [Biologic exploration of the atmosphere by airplane and the possible application of this method to meteorology.] La Météorologie, Ser. 3(1):28–35, Jan./Feb. **1936.** 3 figs., table. **DWB**—Apparatus described for collecting dusts. Plant, animal and mineral matter found to such a degree that author feels it possible to use data of dispersal of these particles in meteorological research of vertical and horizontal movements of the atmosphere. *Subject Headings:* **Aerobiology, Microorganisms, Instruments.**

B–20 Meier, F. C., **Collecting microorganisms from winds above the Caribbean Sea.** Phytopathology, 26:102, **1936. DA**—(Abstract of paper presented at 27th annual meeting of the American Phytopathological Society, 1935.) Report of collections over Caribbean. Trade winds possible agencies in dissemination of microorganisms. *Subject Headings:* **Aerobiology, Microorganisms, Caribbean Sea.**

B–21 Rogers, L. A., and Meier, F. C., **The collection of microorganisms above 36,000 feet.** National Geographic Society, Stratosphere Series, 2:146–151, **1936.** 2 figs., 15 refs. **DA**—Experiment to determine whether under specific atmospheric conditions living spores or reproductive bodies of fungi or bacteria were present in the stratosphere, and if so, what species represented. Background of study, method and equipment, laboratory studies, effect of cold and light on microorganisms, types found. Conclusion that living organisms are carried to the stratosphere and are spread by upper air winds over wide areas. *Subject Headings:* **Aerobiology, Microorganisms, Stratosphere.**

†B–22 Van Overeem, M. A., **A sampling apparatus for aeroplankton.** Akademie van Wetenschappen te Amsterdam, Proceedings. 39(8):981–990, **1936.** 7 figs., 14 refs. **DLC**—Apparatus and methods described. Qualitative research. *Subject Headings:* **Aerobiology, Microorganisms, Instruments.**

B–23 ZoBell, C. E., and Matthews, H. M., **A qualitative study of the bacterial flora of sea and land breezes.** National Academy of Sciences, Proceedings, 22:567–572, **1936.** 2 tables, 9 refs. **DLC**—Wind is an important factor in the interchange of bacteria between land and sea. In these preliminary investigations marine bacteria were detected 30 miles inland, and terrestrial forms, 130 miles at sea. Studies suggest that bacterial content of atmosphere may aid meteorologists in determining whether air masses are of marine or continental origin. *Subject Headings:* **Aerobiology, Microorganisms.**

B–24 Berland, Lucien, **Données récentes sur le transport aerien d'animaux et de plantes, d'aprés des récherches faites en avion.** [Recent contributions on the aerial transport of animals and plants, from investigations made in an airplane.] Société de Biogéographie, Paris, Comptes Rendus, Sommaire des Séances, 14(119):25–28, **1937.** (unchecked.) *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation.**

†B–25 Durham, O. C., **Incidence of air-borne fungus spores. I. Alternaria.** Journal of Allergy, 8(5):480+, July **1937.** 6 figs., table, 18 refs. **DLC**—Importance of fungus spores in study of allergies. Collection methods. Factors involved in mold spore incidence. Distribution. Incidence of air-borne fungus spores. *Subject Headings:* **Aerobiology, Microorganisms.**

†B–26 Fazlulin, N. S., **Mikroflora povitria na girs'kikh vysotakh.** [Microflora of the air of mountain summits.] Medichnii Zhurnal, Kiev, 7:75–79, **1937.** 2 tables, 19 refs. **DSG**—*Subject Headings:* **Aerobiology, Microorganisms.**

B–27 Erdtman, G., **Pollen grains recovered from the atmosphere over the Atlantic.** Meddelanden från Göteborgs Botaniska Trädgård. Acta Horti Göteburgensis, 12:185–196, **1937–1938.** 2 figs., table, 8 refs. **DA**—Investigation to calculate amount of pollen grains carried by winds over a wide sheet of water such as the North Atlantic. Methods described. Results listed. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation, North Atlantic.**

†*B–28 Rempe, Helmut, **Untersuchungen über die Verbreitung des Blütenstaubes durch die Luftströmungen.** [Investigation on the dissemination of pollen by air currents.] Planta, 27:93–147, **1937.** 9 figs., 7 tables, refs. **DLC**—Thorough, technical work, describing methods, factors of dissemination, wind, etc.; pollen counts and analysis at different places, different times, seasons, etc. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation.**

B–29 Humphrey, H. B., **Relation of upper-air-mass movement to incidence of stem rust.** Phytopathology, 28:10, **1938. DA** –(Abstract of paper accepted for presentation at 29th annual meeting of the Society, 1937.) Consideration of high-elevation winds in analysis of epidemic of stem rust. Results and conclusions. *Subject Headings:* **Aerobiology, Microorganisms, Air mass movements.**

B–30 Meier, F. C., and Artschwager, Ernst, **Air-plane collection of sugar-beet pollen.** Science, 88(2291):507–508, **1938. DLC**—table, 3 refs. Method described briefly. Very little data. There seemed to be a larger number of pollen grains at the 5,000 ft. level, which corresponds to the so-called "dust horizon." *Subject Headings:* **Aerobiology, Microorganisms.**

B–31 National Research Council, Committee on Aerobiology, **Aerobiology.** Washington, D. C., April **1938.** 4 p. **DA**—A folder outlining the meaning, scope, and history of aerobiology, giving plans for the proposed central laboratory for aerobiology with a list of its functions. Personnel of the committee on aerobiology listed with addresses. *Subject Headings:* **Aerobiology, Scientific organizations.**

B–32 Proctor, B. E., and Parker, B. W., **Microbiology of the upper air. III. An improved apparatus and technique for upper air investigations.** Journal of Bacteriology, 36:175–184, **1938.** table, 7 refs. **DSG**—This paper is concerned with modifications in the bioaercollector and in laboratory technique involved in its use. *Subject Headings:* **Aerobiology, Instruments, Upper air.**

B–33 Chester, K. S., **Airplane spore traps for studying the annual migration of wheat rust.** Oklahoma Academy of Science, Proceedings, 19:101–104, **1939.** 3 refs. **DLC**—Spore traps described for testing whether the wheat rust summers in other regions and is borne back to Oklahoma by fall winds. Results of flights using traps are given. Conclusion that source of rust is outside the state. Suggestions for control of disease. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation, Oklahoma.**

†B–34 Craigie, J. H., **Aerial dissemination of plant pathogens.** Proceedings of the Sixth Pacific Science Congress, 1939, 4:753–767, **1939.** 82 refs. **DLC**—Partial review given of literature relevant to the subject. Evidence cited of prolific reproductive ability of pathogens, a factor of high survival value to organisms dependent on air movements for their dispersal. Fungal spores and bacterial cells are carried to heights of several miles, but most of this air-borne inoculum occurs in the first two miles of altitude. Possibility of distant spread is presumably enhanced by every increase in elevation. Instances given of distant transport of spores, etc., and evidence presented of disease outbreaks originating from or being intensified by such wind-borne spores. Results of studies made in western Canada on dissemination by air of cereal pathogens briefly summarized. Evidence that spores may be carried several hundred miles from their place of origin. *Subject Headings:* **Aerobiology, Microorganisms, Canada.**

B–35 Jacobs, Woodrow C., **A discussion of physical factors governing the distribution of microorganisms in the atmosphere.** Journal of Marine Research, 2:218–224, **1939.** 8 refs. **DWB**—Relation between biology of air and meteorology pointed out. Discussed: the mechanics of exchange of microorganisms between earth and atmosphere; vertical and horizontal transport of microorganisms; atmosphere as an environment for microorganisms. *Subject Headings:* **Aerobiology, Microorganisms.**

†B–36 Rittenberg, S. C., **Investigations on the microbiology of marine air.** Journal of Marine Research, 2:208–217, **1939.** 4 tables, 15 refs. Study made of microorganisms over an area of the Pacific. Great variation found in numbers of organisms at different stations, but generally

numbers decreased with distance from shore. Molds, bacteria, etc. found. Differences between ocean and air microflora indicate terrestrial origin of most of these organisms. Possible use of these investigations in solving meteorological problems. *Subject Headings:* **Aerobiology, Microorganisms, Pacific Ocean.**

†B–37 Pettersson, Bror, **Experimentelle Untersuchungen über die euanemochore Verbreitung der Sporenpflanzen.** [Experimental research on the wind dispersal of plant spores.] Acta Botanica Fennica, Helsingfors, 25:1–103, **1940.** 5 figs., 12 pages of refs. **DA**—Investigations made in Southwest Finland extending knowledge of the wind dispersal of cryptogamic plants. Experiments tested carriage of diaspores by air for short and long distances. Sampled rainwater for spores. Some spores reported blown from Siberia. (This was disputed by Bergeron, 1944.) *Subject Headings:* **Aerobiology, Microorganisms, Finland.**

B–38 Darling, C. A., and Siple, P. A., **Bacteria of Antarctica.** Journal of Bacteriology, 42:83–98, **1941.** refs. **DSG**—Article outlines study of collection of microorganisms made on Byrd Antarctic Expedition I. Methods of collecting, studies at Little America, and later in U. S. Results. Bacteria seem to be widely distributed in the Antarctic and are probably carried there largely by air currents. *Subject Headings:* **Aerobiology, Microorganisms, Antarctic.**

B–39 Durham, O. C., **Methods in aerobiology.** Journal of Aviation Medicine, 12:153–161, June **1941.** 3 figs., refs. **DLC**—Discussion. Explains the term aerobiology. Deals mainly with methods and purpose of upper air collecting and research of pollen, fungus spores, and insect particles. Gives some data (not tabulated) on collections at various altitudes. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation.**

B–40 Horoshanskaia, D. I., **Issledovanie mikroflory vozdukha Odessy.** [Investigation of the microflora of the air of the city of Odessa.] Gigiena i Zdorovie, 6(2):28–34, **1941.** fig., table. **DSG**—*Subject Headings:* **Aerobiology, Microorganisms, Odessa.**

†B–41 National Research Council, Committee on Apparatus in Aerobiology. **Techniques for appraising air-borne populations of microorganisms, pollen, and insects.** Phytopathology, 31(3):201–225, **1941.** 5 figs., table, 97 refs. **DA**—Excellent discussion of various collection and analyzing techniques for collecting air-borne plant and animal organisms. Sections on: germ theory of disease and origin of life; sanitary air analysis; air-borne pollen dissemination; microorganisms in the upper air; epidemiology of plant diseases; insect population and migration in the air. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation, Insects, Epidemiology.**

†*B–42 Phillips, M. E., **Studies in atmospheric pollen.** Medical Journal of Australia, 2:189–98, **1941.** 4 figs., 3 tables, over 30 refs. **DSG**—Pollen counts made from collections by a weather vane instrument at 11 stations in Australia. Correlations between pollen counts and weather data indicated on graphs. Effects of rain, sun and temperature clearly seen; those of wind and humidity are less obvious. Numbers and percentages of different pollens tabulated. Data considered in regards to hay fever. *Subject Headings:* **Aerobiology, Weather conditions, Microorganisms, Australia.**

†*B–43 ——— **Aerobiology,** Edited by Forest Ray Moulton. Publication of American Association for the Advancement of Science, No. 17, Science Press, Lancaster, Pa., **1942.** 289 p. **DLC**—Symposium on aerobiology. Extramural aerobiology defined as distribution of living organisms by the exterior air, and consequences; insects, plant pathogens, fungus spores, and pollens. Intramural aerobiology: problem of contagion by air-borne infectious matter. Dissemination of pathogenic organisms. Epidemics. Some of the papers contained are:

Christensen, J. J., **Long-distance dissemination of pathogens,** p. 78–87, 4 tables, 64 refs.
Durham, O. C., **Air-borne fungus spores as allergens,** p. 32–47, 4 figs., 2 tables, 60 refs.
Keitt, G. W., **Local aerial dissemination of plant pathogens,** p. 69–77, 60 refs.
Proctor, B. E., and Parker, B. W., **Microorganisms in the upper air,** p. 48–54, 61 refs.
Stakman, E. C., **The field of extramural aerobiology,** p. 1–7.
Wells, W. F., and Wells, M. W., **Air-borne infection as a basis for a theory of contagion, p. 99–101,** graph, 14 refs.
ZoBell, C. E., **Microorganisms in marine air,** p. 55–69, 2 figs., 6 tables, 60 refs.

Subject Headings: **Aerobiology, Microorganisms, Insects, Epidemiology.**

B–44 Bortels, H., **Bezeihungen zwischen Lebensausserungen einiger Mikroorganismen und dem Wetterverlauf.** [Relations between behavior of some microorganisms and the course of weather.] Forschungen und Fortschritte, 18(9/10):98–100, **1942.** 8 figs., refs. **DLC**—Eight

graphs describe relations of microorganisms and weather (pressure). Behavior of microorganisms studied under various weather conditions, graphically illustrated. *Subject Headings:* **Aerobiology, Microorganisms, Weather conditions, Atmospheric pressure.**

†B–45 Dahl, A. O., and Ellis, R. V., **The pollen concentration of the atmosphere.** Public Health Report, 57:369–376, March 1942. 18 refs. Methods of computing pollen concentration of the atmosphere. Method using volumetric factors derived from Stokes' law, less accurate than methods using a unit area basis. Reasons. Formulas. *Subject Headings:* **Aerobiology, Microorganisms, Methods of computation.**

†B–46 Wolf, F. T., **The microbiology of the upper air.** Torrey Botanical Club, Bulletin, 70:1–14, Jan. 1943. 2 figs., 3 tables, 30 refs. **DLC**—Studies undertaken to determine kinds of microorganisms at various altitudes over Nashville, Tenn., to obtain quantitative data as to relative prevalence of the various kinds, and to attempt to correlate these data with existing weather conditions. Technique described and results tabulated. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observations.**

†B–47 Bergeron, Tor, **On some meteorological conditions for the dissemination of spores, pollen, etc., and a supposed wind transport of aloina spores from the region of lower Yenisey to southwestern Finland in July 1936.** Svensk Botanisk Tidskrift, 38(3):269–292, 1944. 3 figs., 2 tables, 8 refs. **DA**—Important theoretical work on the spread of spores and other microorganisms by the wind, with special reference to Finland. *Subject Headings:* **Aerobiology, Microorganisms, Finland.**

†B–48 Durham, O. C., **The volumetric incidence of atmospheric allergens. II. Simultaneous measurements by volumetric and gravity slide methods. Results with ragweed pollen and alternaria spores.** Journal of Allergy, 15:226–235, 1944. fig., 2 tables, 12 refs., (on rate of fall of pollen and apparatus for measurement). **DLC**—Discussion of gravity slides method, which is not considered very accurate, and volumetric apparatus, not yet fully developed, for pollen collecting. Calculation of rate of fall of pollen grains. Estimation of pollen grains per unit of air; arbitrary conversion factors given. For volumetric testing, Hawes device recommended. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation, Instruments.**

†B–49 Hyde, H. A., and Williams, D. A., **Studies in atmospheric pollen. I. A daily census of pollens at Cardiff, 1942.** New Phytologist, 43:49–61, 1944. 3 figs., 3 tables, 10 refs. **DLC**—Detailed investigation of a year's day-to-day census of atmospheric pollen, carried out by the gravity method. Types of pollen and effective pollen seasons discussed. Relations of catch to local sources and local weather influences are considered. *Subject Headings:* **Aerobiology, Microorganisms, Wales.**

B–50 McCubbin, W. A., **Relation of spore dimensions to their rate of fall.** Phytopathology, 34:230–234, 1944. fig., table, 4 refs., equations. **DA**—Rate of fall is primary element in understanding possibilities of spores' dissemination by wind. Equations given and discussed. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation.**

†***B–51** Du Buy, H. G., Hollaender, A., and Lackey, M. D., **A comparative study of sampling devices for air-borne microorganisms.** Public Health Report, No. 184, Washington, D. C., 1945. 40 p., 14 figs., 9 tables, 40 refs., numerous equations. **DSG**—Nine methods studied. Devices classed as impinger devices and atomizer devices. Contents: review of literature; experimental methods; description of sampling devices, media used; comparison of devices on basis of bacterial counts obtained and on basis of factors which affect reproducibility of results, etc. Concluded how data on air-borne microorganisms should be obtained. *Subject Headings:* **Aerobiology, Microorganisms, Instruments.**

†***B–52** Gregory, P. H., **The dispersion of air-borne spores.** British Mycological Society, Transactions, 28:26–72, 1945. 6 figs., 20 tables, 90 refs., equations. **DA**—Thorough treatise on subject. Equations given to determine factors of dispersal. Factors discussed: minor forces, wind, horizontal and vertical forces, individual and group dispersion, spore deposition, eddy diffusion, etc. Theoretical treatment. *Subject Headings:* **Aerobiology, Microorganisms, Methods of computation.**

†**B–53** Stakman, E. C., and Christensen, C. M., **Aerobiology in relation to plant disease.** Botanical Review, 12:205–253, 1946. 151 refs. **DLC**—Important discussion of wind dissemination of phytopathogenic bacteria. *Subject Headings:* **Aerobiology, Microorganisms.**

B–54 Wilson, E. E., and Baker, G. A., **Some of the aspects of the aerial dissemination of spores, with special refernce to conidia of Sclerotinia Laxa.** Journal of Agricultural Research, Washington, D. C., 72(9):301–327, **1946.** Graph, refs. **DA**—As a result of brown rot blossom disease spread by means of air-borne conidia a study was made to determine major factors influencing wind dissemination of spores and to correlate results with data on disease spread. Detailed technical work. *Subject Headings:* **Aerobiology, Microorganisms.**

†*B–55 Wolfenbarger, D. O., **Dispersion of small organisms; distance dispersion, rates of bacteria, spores, seeds, pollen and insects; incidence rates of diseases and injuries.** American Midland Naturalist, 35(1):1–152, Jan. **1946.** 47 figs., 4 tables, 10 pages of refs., equations in Appendix. **DLC**—Highly technical work based on quantitative research, treating every aspect of dispersion of small organisms. Figures show graphically incidences of dispersion of insects, pollen, etc. *Subject Headings:* **Aerobiology, Microorganisms, Insects, Methods of observation.**

B–56 Durham, O. C., **Hormodendrum, alternaria, and rust spores.** Journal of Allergy, 10(1):40–47, **1947.** 4 figs., 2 tables, 3 refs. **DLC**—Description of spores; geographical distribution. Differences by season, storms, etc., in incidence of spores. *Subject Headings:* **Aerobiology, Microorganisms.**

B–57 Polunin, Nicholas, Pady, S. M., and Kelly, C. D., **Arctic aerobiology.** Nature, [London], 160:876–877, **1947.** map, 3 refs. **DLC**—Preliminary report of aerial collections made from arctic regions. Determinations, details, etc., not yet worked out. But unexpected abundance of life in arctic air reported. *Subject Headings:* **Aerobiology, Microorganisms, Arctic.**

B–58 Rombakis, S., **Über die Verbreitung von Pflanzensamen und Sporen durch turbulente Luftströmungen.** [On the dispersal of seeds and spores by turbulent air currents.] Zeitschrift für Meteorologie, 1:359–363, **1947.** 2 figs., table, 3 refs., 60 equations. **DWB**—The theory of Schmidt for the spread of seeds and spores by turbulent air currents is improved upon in many ways. It is shown further that results can be deduced by means of the austausch theory and by theoretical methods of statistical physics. Gives nomograms and tables for calculating speed of dispersal of different biological forms. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation.**

B–59 Crozier, W. D., **Airborne particle study.** Research and Development Division, New Mexico School of Mines. Contract N7ONR-405, Task 1, Project Designation No. NR-082-013. **Report No. 3.,** March **1948.** 10 p., typewritten manuscript. **DLC**—Quarterly report on this project. Work falls into two principal classifications: (1) collection; (2) identification of airborne material. It is hoped that correlations can be found eventually with meteorological data. Three collection techniques being experimentally studied. See also, **Report No. 5,** Sept. **1948.** 21 p., mimeographed. **DLC**—A satisfactory means of general collection of air-borne particles found in an impinger, similar to konimeter. Thermal and electrical collectors found more useful in laboratory work than in field. A program of collection has been carried out. Counts of sodium chloride particles, pollens, spores, etc., are underway. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation, Instruments.**

B–60 Greco, J. B., **Aerobiologia; variacões da concentração de polens aéros em três zonas de Belo Horizonte.** [Aerobiology; variations of concentration of aerial pollen in three zones of Belo Horizonte.] Hospital, Rio, 34:763–766, **1948.** fig., 6 refs. **DSG**—Brief article contains: methods of study, graphical results, conclusions. *Subject Headings:* **Aerobiology, Microorganisms, Methods of observation, Brazil.**

B–61 Harrington, E. R., and Crozier, W. D., **A thermal precipitator for sparse dispersions of aerosols.** Research and Development Division, New Mexico School of Mines. Contract N7ONR-405, Task 1, Project Designation No. NR-082-013. Airborne particle study, Technical Report No. 2-NR, Dec. **1948.** 14 p., 2 plates, table, 10 refs. **DLC**—Thermal precipitator built which is capable of 100% collection of aerosols from one liter of air per minute. Satisfactory for collection from some natural atmospheres, though still not so effective as desired for the very sparse dispersions sometimes met. Greatest value of device probably in collection of particles, the sizes of which are below effective range of impingement devices, and as a standard in laboratory studies of the performance of impingement, and other equipment. *Subject Headings:* **Aerobiology, Microorganisms, Instruments, Aerosols.**

†B–62 Gislén, Torsten, **Aerial plankton and its condition of life.** Biological Review, Cambridge Philosophical Society, 23(2):109–126, **1948.** 61 refs. **DA**—Discussion separately of aerial

distribution of large and small organisms and microorganisms. Examples given. Effects of storms, convection currents, rain, humidity, ultraviolet light, temperature, etc., on distribution. It is stated that microforms are often distributed around globe in certain definite climatic belts. *Subject Headings:* **Aerobiology, Microorganisms.**

B–63 Newman, I. V., **Aerobiology on commercial air routes.** Nature, [London], 161:275–276, Feb. 1948. table, 6 refs. **DWB**—Slides exposed during an airplane trip from New Zealand across the Tasman Sea and south Australia gave indications of air masses or trajectories as long as 1,200 miles. Type of spores collected indicate origin of air which carried them. Possibility suggested of using pollen studies for determining paths of air masses. *Subject Headings:* **Aerobiology, Microorganisms, Air mass movements.**

B–64 Crozier, W. D., and Seely, Ben K., **Airborne particles collected on a transcontinental airplane flight.** Research and Development Division, New Mexico School of Mines. Contract N7ONR-405, Task 1. Project Designation No. NR-082-013. Airborne particle study, Technical Report No. 1-NR, Jan. 1949. 20 p., 4 figs., 10 refs. **DLC**—It is demonstrated that significant collections of air-borne particles could be made with simple impactment equipment. Identification and counting of collections show significant variations from point to point. Correlation with concentrations of various constituents with meteorological situations seems evident; more collections needed for details. Results suggest a technique for study of convection and general air movement. *Subject Headings:* **Aerobiology, Microorganisms, Instruments.**

B–65 Mitchell, R. B., Stumm, P. W., et al., **Studies on microorganisms of the upper atmosphere; the development of a soluble collection filter for microorganisms present in the air.** Randolph Field, 1949, Forms Report No. 2, Project No. 21-02-118, U. S. Air Force School of Aviation Medicine, 1949. **DSG**—(Unchecked.) *Subject Headings:* **Aerobiology, Microorganisms, Instruments.**

SECTION II. INSECT POPULATION OF THE AIR
(551.586:57)

B–66 Müller, Albert, **On the dispersal of non-migratory insects by atmospheric agencies.** Entomological Society of London, Transactions, Part II, p. 175–186, 1871. **DA**—Historical interest. Early note on wind as an important factor in aerial dissemination of insects. Fairly generalized, but containing several specific observations of insects on high mountains, at the top of towers, etc. *Subject Headings:* **Aerobiology, Insects.**

B–67 Schaupp, F. B., **Flight of Lepidoptera in mid-ocean.** Brooklyn Entomological Society, Bulletin 2(1):73, 1879. **DA**—Brief item noting immense numbers of butterflies 60 miles from Brazil coast on rainy day, indicating approach of the Pampero (southwest wind). *Subject Headings:* **Aerobiology, Lepidoptera.**

B–68 Webster, F. M., **Winds and storms as agents in the diffusion of insects.** American Naturalist, 36:795–801, 1902. **DLC**—Effects of weather on mating, feeding, dispersion, etc., of insects. Observations and examples of wind transport of insects, effects of storm. Generalized treatment; no scientific data. *Subject Headings:* **Aerobiology, Insects.**

B–69 Hinds, W. E., **Is there any definite basis for forecasting insect outbreaks and ascertaining if control measures are practicable? A discussion from a research standpoint.** Journal of Economic Entomology, 21:559–563, 1907. **DA**—Difficulties and problems of forecasting insect outbreaks discussed. Influences of weather and other factors depend on individual species. Some examples given. Forecasting impossible in many cases, says author. *Subject Heading:* **Insect forecasting.**

B–70 Schuster, L., **Über den Einfluss der Sonnenfleckenperioden auf die Insektenwelt.** [On the influence of sunspots on insects.] Zeitschrift für Wissenschaftliche Insekten Biologie, 5:65–66, 1909. **DA**—Brief item, with no data, attempting to correlate sunspots and periodic invasions of insects. *Subject Headings:* **Insects, Sunspots.**

B–71 Collins, C. W., **Dispersion of gipsy-moth larvae by the wind.** U. S. Dept. of Agriculture, Bulletin No. 273, Washington, D. C., Aug. 1915. 20 p., 6 plates, 7 tables, map, showing dispersion of the gipsy-moth in New England and area quarantined, 1914. **DA**—Experiments and observations of dispersion of moth in various wind conditions. *Subject Headings:* **Aerobiology, Lepidoptera.**

B–72 Quayle, H. J., **Dispersion of scale insects by the wind.** Journal of Economic Entomology, 9:486–493, **1916.** fig., table, refs. **DA**—Scales are carried chiefly by wind. Observational data given. Importance of carrying on fumigation work over large area because of wind. *Subject Headings:* **Aerobiology, Insects.**

B–73 Collins, C. W., **Methods used in determining wind dispersions of the gipsy-moth and some other insects.** Journal of Economic Entomology, 10:170–176, **1917. DA**—plates, table, refs. Wind data correlated with collections of insects on screens in Massachusetts. Wind is big factor in dispersal. *Subject Headings:* **Aerobiology, Lepidoptera.**

B–74 McColloch, J. W., **Wind as a factor in the dispersion of the hessian fly.** Journal of Economic Entomology, 10:162–168, **1917.** 2 tables, refs. **DA**—Field observations and experiments give evidence of how wind aids in diffusion of hessian fly for short distances. *Subject Headings:* **Aerobiology, Insects.**

B–75 Ball, S. C., **Migrations of insects to Rebecca Shoal Lightstation and the Tortugas Islands, with special reference to mosquitoes and flies.** Papers from the Department of Marine Biology, Carnegie Institution, Washington, D. C., 12(10):193–212, **1918.** table, 7 refs. **DLC**—Purpose to determine whether mosquitoes can migrate across the sea for considerable distances either by own powers of flight or with aid of favorable winds. Conditions and observations at the islands off Southern Keys reported. Table shows weather conditions in relation to kinds and numbers of insects taken. Concluded that certain insects are brought with certain wind directions. *Subject Headings:* **Aerobiology, Mosquitoes, Insect migration, West Indies.**

†**B–76** Hurd, Willis Edwin, **Influence of the wind on the movements of insects.** Monthly Weather Review, 48:94–98, **1920.** 23 refs. Excellent general account of the effects of winds on various types of insects in different regions. No data. *Subject Headings:* **Aerobiology, Insects.**

*B–77 Rudolfs, Willem, **Observations on the relations between atmospheric conditions and the behavior of mosquitoes.** New Jersey Agricultural Experiment Station Bulletin, No. 388, **1923.** 32 p., 6 figs., 6 tables, 22 refs. **DLC**—Study made to learn more about the possibility of a simple direct relation between behavior of mosquitoes and one or more environmental factor such as temperature, relative humidity, wind velocity, wind direction, light, previous precipitation, etc. Results presented on behavior of mosquitoes with different wind velocities and different times of day. *Subject Headings:* **Mosquitoes, Weather conditions.**

B–78 Williams, C. B., **Records and problems of insect migration.** Entomological Society of London, Transactions, p. 207–233, **1923.** 3 figs. **DA**—Wind effects on migration (p. 216–220) discussed from speculative point of view. Not much data available at this early date. Other influences on migration discussed. *Subject Headings:* **Insect migration, Weather conditions.**

B–79 Felt, E. P., **Dispersal of butterflies and other insects.** Nature, [London], 116:365–368, **1925.** Discussion of long distance dispersal of insects, accomplished largely by a drifting with the wind, especially in the high velocities of the upper air strata. Article gives examples and observations of insect flight with some conclusions and mention of economic importance, but only incidentally alludes to the meteorological phases. *Subject Headings:* **Aerobiology, Lepidoptera.**

B–80 Elton, Charles, **The dispersal of insects to Spitzbergen.** Entomological Society of London, Transactions, p. 289–299, **1925.** 7 refs. **DA**—Examples from personal observations make it appear that wind, flight, birds, and ships are responsible for the dispersal of insects to Spitzbergen. Sometimes voluntary migration seems to play a part. *Subject Headings:* **Aerobiology, Insect migration, Spitzbergen, Arctic.**

B–81 Felt, E. P., **The dissemination of insects by air currents.** Journal of Economic Entomology, 18:152–158, **1925. DA**—Author cites some early incidents of wind dispersal of insects. Believes wind currents of more importance in insect distribution than generally considered at that time. *Subject Headings:* **Aerobiology, Insects.**

B–82 Felt, E. P., **The distribution of insects and the significance of extralimital data.** Entomological Society of Ontario, 56th Annual Report, p. 44–47, **1925.** ref. **DA**—Many extensive movements of insects are due to a drifting with favourable winds. This gives an explanation of extralimital records of insects, beach drifts and large accumulations of insects upon glaciers. Stresses importance of correlating meteorological data and insect drift. No specific data given. *Subject Headings:* **Aerobiology, Insects.**

B–83 Visher, S. S., **Tropical cyclones and the dispersal of life from island to island in the Pacific.** American Naturalist, 59:70–78, 1925. refs. **DLC**—Various continent-changing and wind-drift theories of dispersal of life in Pacific discussed. Carrying of insects by wind particularly emphasized. Geologic changes in conditions considered. *Subject Headings:* **Insects, Cyclones, Pacific islands.**

B–84 Felt, E. P., **The physical basis of insect drift.** Nature, [London], 117:754–755, 1926. **DWB**—Drift of insects seen closely correlated with convection currents, wind patterns, and storm winds. Author believes more study and understanding of meteorological agencies involved will assist in solving problems of extensive migrations and drifts of insects. *Subject Headings:* **Aerobiology, Insects.**

B–85 Lutz, F. E., **Wind and the direction of insect flight.** American Museum Novitates, 291, 1927. 4 p., graph, table. **DA**—Apparatus described to test influence of wind on insects. Short report of results of tests showing wind effects. *Subject Headings:* **Aerobiology, Insects, Instruments.**

B–86 Weiss, H. B., **Insects captured in the look-out stations of New Jersey.** New Jersey Dept. of Agriculture, Bureau of Statistics and Inspection, Circular No. 106, 1927. 19 p., map, 6 tables, refs. **DA**—Detailed records of captures. Collections made at fire look-out stations all over New Jersey. Considerable insect population found above line of vegetation. Once in upper air, distribution would depend upon velocity and direction of air currents. No correlation could be found between abundance of insects in air and strong convectional currents preceding thunderstorms. *Subject Headings:* **Aerobiology, Insects, Thunderstorms.**

*B–87 Felt, E. P., **Dispersal of insects by air currents.** Bulletin of New York State Museum, 274:59–129, 1928. tables, refs. **DA**—Important early investigation demonstrating that winds, especially those of the upper air, account for an as yet undetermined degree of extended movements of insects. Discussed are: meteorological data, winds, air currents, etc., dispersive effects, pressure, temperatures; insect population of air; altitudes reached; ballooning spiders; buoyancy; insects at sea, in desert, in storms, on mountains, in extreme north, along the littoral, in Hawaii; swarming; direction and rate of spread; drifting or spreading of insects in various groups. *Subject Headings:* **Aerobiology, Insects.**

†B–88 Bristowe, W. S., **The distribution and dispersal of spiders.** London Zoological Society, Proceedings, 43:633–657, 1929. 5 figs., tables, 37 refs. **DLC**—In Part I wind is not considered. In Part II dispersal discussed from various standpoints: by wind; gossamer; effectiveness of flights as a means of dispersal; migrations, cause, species, distribution; etc. *Subject Headings:* **Aerobiology, Aerial spiders.**

B–89 De Gryse, J. J., **The relation of entomology to meteorology.** Conference of Empire Meteorologists, Agricultural Section, 2:148–167, 1929. **DLC**—Some of the research work done in Canada outlined briefly. Suggestions given for collecting and analyzing data for the study of relations between entomology and meteorology. *Subject Headings:* **Insects, Weather conditions, Methods of observation, Canada.**

B–90 ——— **Organization and progress of pink bollworm research investigation.** Journal of Economic Entomology, 22(5):743–750, 1929. **DA**—Preliminary report on research. Migratory habits of species found interesting. Airplane collections showed moths present at considerable altitudes in the upper air, and it is evident that wind transportation may be an important factor in spread. *Subject Headings:* **Aerobiology, Lepidoptera, Methods of observation.**

B–91 Swellengrebel, N. H., **On the influence of wind in the spread of Anopheles Maculipennis.** American Journal of Hygiene, 10:419–434, 1929. figs., table, 27 refs. **DLC**—Collections of mosquitoes correlated with wind conditions. Scientific experiments described, shown graphically and discussed. Concluded that wind is of more importance in the dispersion of mosquitoes as a means of transport in the direction it is blowing, than may be gathered from literature of the time. *Subject Headings:* **Aerobiology, Mosquitoes.**

B–92 Uvarov, B. P., **Weather and climate in their relation to insects.** Conference of Empire Meteorologists, Agricultural Section, 2:130–146, 1929. 40 refs. **DLC**—Author attempts to show how meteorological elements influence insect life and activities. Temperature, humidity and precipitation, wind, atmospheric pressure, electricity, light, etc., are discussed. Geographical and

ecological distribution, cycles and periodicity. *Subject Headings:* **Aerobiology, Insects, Weather conditions.**

†*B–93 Williams, C. B., **Migration of butterflies.** Oliver and Boyd, London, 1930. 473 p. 71 figs., tables, 25 pages of refs. **DLC**—Chapters particularly discussing weather and wind influences on flights and distribution of insects are: **XVI. Conditions determining the start of the flight; XVII. Determination of route and goal:** including consideration of wind, at ground level, upper air currents, in relation to height of flight, mechanics of wind appreciation, wind and temperature, and other weather factors. *Subject Headings:* **Aerobiology, Lepidoptera, Weather conditions.**

B–94 Coad, B. R., **Insects captured by airplane are found at surprising heights.** U. S. Dept. of Agriculture Yearbook, 1931. p. 320–323, 4 figs. Airplane collections of insects made to determine altitude at which various insects travelled so that winds and insect dispersal could be correlated for economic purposes. Procedure described. Numbers and types of insects found at different altitudes enumerated. *Subject Headings:* **Aerobiology, Insects, Methods of observation.**

†*B–95 Uvarov, B. P., **On insects and climate.** Entomological Society of London, Transactions, 79, Part I, April 1931. 247 p., 53 figs., 40 tables, 45 pages of refs. **DA**—A major work on all aspects of climatic effects on insects. Part I concerns the physical factors of insect life: heat, humidity, light, radiation, atmospheric pressure, electricity, and movements of the air. Part II discusses relation of weather to activities of insects, daily and annual cycles, climate and distribution, including factors of dispersal and ecological distribution, effect of climate on abundance, and climate and weather in economic entomology, including use of meteorological data and forecasting of distribution outbreaks, etc. *Subject Headings:* **Aerobiology, Insects, Weather conditions.**

B–96 Talman, Charles Fitzhugh, **Meteorology vs. insects.** American Meteorological Society, Bulletin, 13:102–103, May 1932. A general article briefly discussing temperature and humidity control of insects, air currents and insect collections made from airplanes, wind-borne insects and possibilities of invasions of insects from afar. *Subject Headings:* **Aerobiology, Insects, Weather conditions.**

B–97 Wall, R. E., **Prediction of pale western cutworm increase in Montana is fulfilled.** Journal of Economic Entomology, 25:1043–1048, 1932. 2 figs., refs. **DA**—Prediction of this cutworm outbreak verified a method of prediction made a season in advance. Analysis of new data on relation of weather to increase and decrease in cutworm abundance expected to permit further refining of forecasting method. *Subject Headings:* **Insect forecasting, Weather conditions.**

B–98 Collins, C. W., and Baker, W. L., **Exploring the upper air for wind-borne gypsy moth larvae.** Journal of Economic Entomology, 27:320–327, 1934. 3 figs., 2 tables. refs. Importance of wind in dispersion of this insect. Experiments described. Many larvae found. *Subject Headings:* **Aerobiology, Lepidoptera, Methods of observation.**

B–99 Warnecke, G., **Mikroklima und Verbreitung der Lepidopteren.** [Microclimate and distribution of Lepidoptera.] Entomologische Beihefte aus Berlin-Dahlem, 1:120–130, 1934. 2 charts. **DA**—*Subject Headings:* **Lepidoptera, Weather conditions.**

B–100 Felt, E. P., and Chamberlain, K. F., **The occurrence of insects at some heights in the air, especially on the roofs of high buildings.** New York State Museum Circular, 17:1–10, 1935. 4 figs., refs., (p. 70). **DA**—Collections of insects from the tops of buildings revealed 1,000 different species, 25 of which were new to New York State collectors. Importance of wind dispersal of insects emphasized. These investigations among earliest with regards to insects and air currents. No data tabulated. *Subject Headings:* **Aerobiology, Insects.**

B–101 McDonald, R. E., and Loftin, U. C., **Dispersal of the pink bollworm by flight or wind carriage of the moths.** Journal of Economic Entomology, 28:745–755, 1935. 2 figs., 2 tables. **DA**—Information gathered by airplane collections indicates that this insect is carried involuntarily by wind for considerable distances. Description of experiments and data. *Subject Headings:* **Aerobiology, Lepidoptera.**

B–102 Melnichenko, A. N., **Zakonomernosti massovykh pereletov lugovogo motyl'ka i problema postroeniia prognoza ego zaletov.** [Laws of mass flying of the adult Loxostege Sticticalis L. and the problem of the prognosis of their flight migrations.] Leningrad, Institute Zashchity Rastenii, Trudy po Zaschite. Rastenii, Ser. I, No. 17, 1935. 56 p., 8 figs. ,tables, refs. Article in Russian.

English summary. **DLC**—Discussion of these moths' activities, migratory habits, etc., and the influence of meteorological factors upon them. Air temperature at various heights and changes of wind velocity are of particular importance. *Subject Headings:* **Aerobiology, Lepidoptera, Insect forecasting, Weather conditions.**

B–103 Davies, W. M., **Studies on the aphides infesting the potato crop. V. Laboratory experiments on the effect of wind on the flight of Myzus Persicae Sulz.** Annals of Applied Biology, 23:401–408, **1936.** fig., 14 refs. **DLC**—Dealing with the results of experiments on the reaction of winged aphides to the wind factor produced artificially in an attempt to attain precise data on the subject. *Subject Headings:* **Aerobiology, Insects, Methods of observation.**

B–104 Noble, L. W., **The biological possibility of infestation by flight of the pink bollworm moth.** Journal of Economic Entomology, 29:78–79, **1936. DA**—Study made to determine whether females of species would still be fertile after exposure to conditions of upper air. After 7 days isolation female moths were still able to produce fertile eggs. Thus infestation could be spread by winds of upper air, although degree of damage caused by winds to insects not here determined. *Subject Headings:* **Aerobiology, Lepidoptera.**

***B–105** Swynnerton, C. F. M., **The tsetse flies of East Africa. A first study of their ecology, with a view to their control.** Royal Entomological Society of London, Transactions, 84:1–579, **1936.** 33 figs., 22 plates, 7 maps, 66 tables, refs., (extensive). **DA**—A detailed paper giving a thorough account of an investigation of tsetse flies, including meteorological factors as one part. Interesting from standpoint of how a comprehensive insect investigation is carried through. *Subject Headings:* **Insects, Ecology, Methods of observations.**

B–106 Felt, E. P., **Balloons as indicators of insect drift and of dutch elm disease spread.** Bartlett Tree Research Laboratory, Bulletin, 2:3–10, Feb. **1937.** fig., tables, 5 refs. **DA**—Investigation of wind currents in the spread of insects with particular reference to dutch elm disease spread. Balloon and insect drift records correlated. Author believes some instances of the disease spread are due to wind drift. *Subject Headings:* **Aerobiology, Insects, Methods of observation.**

B–107 Felt, E. P., **Dissemination of insects by air currents.** Journal of Economic Entomology, 30:458–461, **1937.** Author cites briefly numerous incidences where insect drift and infestation have been promulgated by wind. *Subject Headings:* **Aerobiology, Insects.**

B–108 Hardy, A. C., and Milne, P. S., **Insect drift over the North Sea.** Nature, [London], 139:510–511, **1937.** Chart showing insect captures over the North Sea, indicating large "aerial plankton" population drifting over the sea. Some areas void of insect life. Theories briefly expounded. *Subject Headings:* **Aerobiology, Insects, North Sea.**

***B–109** Williams, C. B., **The influence of moonlight on the activity of certain nocturnal insects, particularly the family Noctuidae, as indicated by a light trap.** Royal Society of London, Philosophical Transactions, 226:357–69, **1937.** 7 figs., 14 tables, 12 refs. **DLC**—Extensive scientific investigation of theory that insect activity is reduced at full moon. Insect collections correlated with conditions of moon, cloud, temperature, and humidity. Lunar effect on captures is definitely demonstrated. *Subject Headings:* **Insects, Lunar effects, Weather conditions.**

B–110 Williams, C. B., **The use of logarithms in the interpretation of certain entomological problems.** Annals of Applied Biology, 24:404–414, **1937.** 4 figs., 3 tables, 2 refs. **DLC**—Mathematical theories of comparing numbers of insects caught under varying conditions discussed. Use of logarithms recommended. *Subject Headings:* **Aerobiology, Insects, Mathematical determinations.**

B–111 Darlington, P. J., Jr., **The origin of the fauna of the Greater Antilles, with discussion of dispersal of animals over water and through the air.** Quarterly Review of Biology, 13:274–300, **1938.** 5 figs., 40 refs. **DLC**—This work investigates how fauna of the four big islands of the West Indies was derived from the mainland, whether across the water or over land connections. Theory and mathematics of dispersal of organisms across water gaps taken up. Diagrams show wind directions and hurricane patterns, along with discussion of direction, nature, and lifting power of winds. *Subject Headings:* **Aerobiology, Animals, Insects, West Indies.**

B–112 Freeman, J. A., **Composition of the aerial insect fauna up to 300 feet.** Nature, [London], 142:153, **1938.** 3 diagrs., show composition of aerial fauna at 277, 177, and 10 feet. Brief

article on the principal findings of studies on insect drift at lower levels; most favorable condition given for maximum numbers in air. Presence of large insect population in air throughout yea indicates importance of wind dispersal. Economic significance. *Subject Headings:* **Aero biology, Insects.**

B–113 Gaines, J. C., and Ewing, K. P., **The relation of wind currents, as indicated by balloon drifts, to cotton flea hopper dispersal.** Journal of Economic Entomology, 31(6):674–677, 193 fig., map, table. **DA**—Balloon-drifts indicate prevailing winds. Fleahoppers can be carrie long distances by these winds and infest new areas. *Subject Headings:* **Aerobiology, Insects Methods of observation.**

B–114 Hardy, A. C., and Milne, P. S., **Studies in the distribution of insects by aerial currents experiments in aerial tow-netting from kites.** Journal of Animal Ecology, 7(2):199–229, 193 15 figs., plates, 9 tables, 17 refs. **DLC**—Important scientific work on subject. Equipment an methods of working fully described. Composition of aerial plankton at different heights deter mined; height distribution of different families compared. Influence of weather conditions an effects on different insects; high temperature and low humidity found for all to be more favorabl to aerial drift than the reverse conditions. Average density of drifting population estimated fo different height ranges up to 2,000 ft. Economic significance of insect drift discussed. *Subjec Headings:* **Aerobiology, Insects, Weather conditions, Methods of observation.**

B–115 Hardy, A. C., and Milne, P. S., **Aerial drift of insects.** Nature, [London], 141:602–603 **1938.** 2 figs., refs. Letter to the editor giving some preliminary data of studies on distributio of insects by aerial currents. *Subject Headings:* **Aerobiology, Insects.**

B–116 McClure, H. E., **Insect aerial populations.** Annals of Entomological Society of America 31:504–513, **1938.** 5 graphs, 3 tables, 7 refs. **DA**—Collections made of insects from the lowe air. Influences of time of day, season, weather, etc., on numbers found. *Subject Headings* **Aerobiology, Insects.**

B–117 Stearns, L. A., and MacCreary, Donald, **Leafhopper migration across Delaware Bay** Journal of Economic Entomology, 31(2):226–229, **1938.** **DA**—Observations taken at lighthouses various distances from shore. Movements of insects correlated with prevailing SW wind of area Peak flights associated with high mean temperature, a clear night, and a moderate wind. The natural barrier of the Bay is but a slight hindrance when conditions are favorable for insect migra tion. *Subject Headings:* **Aerobiology, Insect migration.**

†**B–118** Bristowe, W. S., **The comity of spiders. Vol. I.** Ray Society, London, **1939,** Chapte III. **The dispersal of spiders.** Dispersal by air. p. 182–204. graph, table, refs. (p. 226–228.) **DA**—*Subject Headings:* **Aerobiology, Aerial spiders.**

B–119 Felt, E. P., **Balloon releases and dutch elm disease spread.** Bartlett Tree Research Laboratory, Bulletin, 3:20–25, Dec. **1939.** 4 figs. **DA**—Continuation of earlier work. Possi bility of there being connection between dutch elm disease and drifting of infected beetles fo considerable distances shown. *Subject Headings:* **Aerobiology, Insects.**

†***B–120** Glick, P. A., **The distribution of insects, spiders, and mites in the air.** U. S. Dept. o Agriculture, Technical Bulletin No. 673, May **1939.** 150 p., 13 figs., 16 tables, 79 refs. Content include comprehensive discussion of scope of work; collecting ground; airplane insect traps seasonal distribution of insects; altitudinal distribution, day and night; insects collected, physical features, etc.; meteorological data on temperature, dew point, absolute and relative humidity, vapor and barometric pressure, air currents, light, clouds, precipitation, electrical state of the atmosphere; results of Mississippi flood; seeds in upper air; sources of insects and routes of migra tion; aircraft as insect carriers; collecting insects in upper air. *Subject Headings:* **Aerobiology, Insects.**

†***B–121** Whitfield, F. G. Sarel, **Air transport, insects and disease.** Bulletin of Entomological Research, 30:365–442, **1939.** 3 maps, 13 tables, refs. **DLC**—Section 3—**Insects and wind.** Insect population of the air. A broad work, discussing primarily transport of insects by aircraft, but giving, also, thorough attention to the insect population of the air, how it gets there, flight ranges of insects, and wind as a factor in dispersal. *Subject Headings:* **Aerobiology, Insects.**

B–122 Parman, D. C., **Research in preventive entomology.** Journal of Economic Entomology, 33:749–754, **1940.** 2 figs. **DA**—Plan for preventive entomology discussed. Climate, weather,

and dissemination are important factors. *Subject Headings:* **Preventive entomology, Weather conditions.**

B–123 Thomas, I., and Vevai, E. J., **Aphis migration; an analysis of the results of five seasons' trapping in North Wales.** Annals of Applied Biology, 27:393–405, **1940.** 5 figs., 5 tables, refs. **DLC**—Experiments conducted and correlation made between flights of aphides and meteorological effects on other aspects of production and development. *Subject Headings:* **Aerobiology, Insect migration, Weather conditions, Wales.**

*B–124 Williams, C. B., **An analysis of four years captures of insects in a light trap. Part II The effect of weather conditions on insect activity; and estimation and forecasting of changes in the insect population.** Royal Entomological Society of London, Transactions, 90:227–306, **1940.** 24 figs., 49 tables, 7 refs. **DA**—Comprehensive treatment of subject. Meteorological factors thoroughly considered. *Subject Headings:* **Insect forecasting, Weather conditions.**

B–125 MacCreary, Donald, and Stearns, L. A., **Comparative density of mosquitoes at ground level and at an elevation of approximately one hundred feet.** Journal of Economic Entomology, 34:174–179, **1941.** fig., 5 tables, refs. **DA**—Collections made in northern and southern Delaware. Procedure, collections described. Meteorological data given and correlated with mosquito flights. *Subject Headings:* **Aerobiology, Mosquitoes, Weather conditions, Delaware.**

†B–126 Glick, P. A., **Insect population and migration in the air.** Aerobiology, American Association for the Advancement of Science, Publication No. 17:88–98, **1942.** 2 figs., 2 tables, 58 refs. **DLC**—Abundance and occurrence of insects in the air considered. Collection devices and methods used to estimate insect populations of the air. Tables give densities of insects in air, day and night, at various altitudes. Factors discussed which affect aerial population and migration of insects, mainly meteorological factors. Scientific and economic importance of investigating insect fauna of upper air discussed. *Subject Headings:* **Aerobiology, Insects, Insect migration, Methods of observation, Weather conditions.**

B–127 Dethier, V. G., and Whitley, F. H., **Population studies of Florida mosquitoes.** Journal of Economic Entomology, 37(4):480–484, **1944. DA**—Numerical abundance was directly influenced by rainfall, air temperature, and wind velocity. *Subject Headings:* **Mosquitoes, Weather conditions, Florida.**

B–128 Dammerman, K. W., **Insecten op bergtoppen en in hoogere luchtlagen.** [Insects of the mountain tops and in the upper strata of the air.] Tijdschrift voor Entomologie, 88:127–131, **1945.** 8 refs. **DA**—*Subject Headings:* **Aerobiology, Insects.**

*B–129 Freeman, J. A., **Studies in the distribution of insects by aerial currents; the insect population of the air from ground level to 300 feet.** Journal of Animal Ecology, 14(2):128–154, **1945.** 3 figs., 35 tables, refs. **DLC**—The insect population above an area of agricultural land in Lincolnshire was sampled at heights of 10, 177, and 277 feet, over a front of 4,400 ft. Population mostly small weak-flying insects drifting involuntarily before the wind. Composition of the aerial fauna is discussed; variation in time of year, estimates of numbers, monthly distribution, etc. Relation of fauna to vegetation. Effect of wind direction on composition and numbers of insects; distribution. Effects of biological and meteorological factors upon the occurrence of insects in the air. *Subject Headings:* **Aerobiology, Insects, Weather conditions.**

B–130 ——— **Insects and weather.** A discussion at a joint meeting of the Royal Entomological Society of London and the Royal Meteorological Society. Royal Meteorological Society, Quarterly Journal, 71:221–230, **1945.** 3 figs., 6 refs. Articles included are: 1.–Gunton, H. C., **Phenological relationships of meteorology and entomolgy.** 2.–Williams, C. B., **Fluctuations in insect populations as related to weather conditions.** 3.–Slater, A. E., **Vertical air currents as agents of insect dispersal.** 4.–Uvarov, B. P., **The organization of bioclimatic research.** Discussion. *Subject Headings:* **Aerobiology, Insects, Ecology, Weather conditions.**

B–131 Russell, P. F., Knipe, F. W., Rao, T. Ramachandra, and Putnam, P., **Some experiments on flight range of Anopheles Culicifacies.** Journal of Experimental Zoology, 97:135–163, **1944.** 13 figs., 4 tables, refs. **DA**—Thorough work, attempting to determine effective flight range of mosquitoes. Experiments and observations described. Relation of flight to wind direction discussed and observations tabulated. Extensive conclusions. *Subject Headings:* **Aerobiology, Mosquitoes.**

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Part III. Thermal convection. Idem., 77(3):44–49, 1945. 4 refs. Thermal convection considered most important of the various types of convective processes for the vertical and horizontal distribution of insects. Convection is the only process by which insects attain considerable altitudes in free atmosphere. It is possible to predict altitudes attainable by analysis of air mass characteristics and by generalizing with cloud-types. As a means of lengthy horizontal transport for insects convection cannot be considered effective, although thunderstorms may act as a medium for rapid redistribution of insects over a wide area. Presence of birds as indicators of insect density in zones of atmosphere discussed.

Part IV. Distributive processes of economic significance. Idem., 77(4):69–73, 1945. Possibility explained and discussed whereby entomologists may utilize the short-range high- or low-altitude weather processes produced by local topography in planning control of insect pests. This type of distributive process is of more economic importance in transporting insects in mass than long distance distribution by wind, since the latter is an unsteady phenomenon, only occasionally transporting a few individuals. *Subject Headings:* **Aerobiology, Insects, Convection currents, Preventive entomology, Weather conditions.**

†*B–133 Waloff, Z., **Seasonal breeding and migrations of the desert locust in eastern Africa.** Anti-Locust Memoir, No. 1, Anti-Locust Research Center, British Museum (Natural History), **1946.** 30 maps, 38 refs. Tables in appendices. **DLC**—Discussed are: objective, area involved, material and method of analysis. Physical features and climate of eastern Africa. Seasonal breeding of swarms and its relation to rainfall. Seasonal migrations of swarms and factors affecting: trends in relation to wind, factors affecting flight activity. Climatic conditions. Concluded that distribution of swarms at any season is largely dependent on the pattern of air temperature and winds. See also Anti-Locust Memoir No. 2. *Subject Headings:* **Insect migrations, Locusts, Preventive entomology, Weather conditions, Africa.**

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†*B–135 Broadbent, L., **An analysis of captures of aphididae in a lighttrap.** Royal Entomological Society of London, Transactions, 98:475–490, **1947.** fig., 11 tables, 14 refs. **DA**—Analysis of night flight of aphides for four years. Correlation between captures and meteorological factors prevailing. Activity positively correlated with maximum temperature of previous day and with evening reading of dew point; negatively correlated with wind force of previous afternoon; wind direction had significant effect. Population changes attributed to extent of summer rainfall. *Subject Headings:* **Aerobiology, Insects, Weather conditions.**

†*B–136 Donnelly, U., **Seasonal breeding and migrations of the desert locust in western and north-western Africa.** Anti-Locust Memoir, no. 3, Anti-Locust Research Center, British Museum (Natural History), **1947.** 43 p., fig., 19 maps, 36 refs. **DLC**—Tables in appendices. Work undertaken to describe the seasonal distribution of breeding and to find out the major trends in the migrations of the desert locust throughout West Africa area. Description of topography, methods on analysis, seasonal breeding of swarms and its relation to rainfall. Seasonal migrations of swarms, annual cycles, etc. *Subject Headings:* **Insect migrations, Locusts, Weather conditions, Preventive entomology, Africa.**

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Similarly in the subject index the subject headings in both sections are used in combination to form one index. However, when, as in the case of the term **Aerobiology,** too many references would appear, the reader is referred back to the table of contents in Part II where he will find the complete list of references. This index is divided into four parts:

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